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SOUTHWEST FISHERIES CENTER
NATIONAL MARINE FISHERIES SERVICE HONOLULU LABORATORY 2570 DOLE STREET HONOLULU, HAWAII 96822-2396

January 1991

FISHERY STATISTICS OF THE WESTERN PACIFIC

VOLUME VI

Territory of American Samoa (1989)

Commonwealth of the Northern Mariana Islands (1989)

Territory of Guam (1989)

State of Hawaii (1989)

Compiled by

David C. Hamm, Michael M. C. Quach, and Leslie K. Timme

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Southwest Fisheries Science Center
National Marine Fisheries Service, NOAA
Honolulu, Hawaii 96822-2396

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ADMINISTRATIVE REPORT H-91-01

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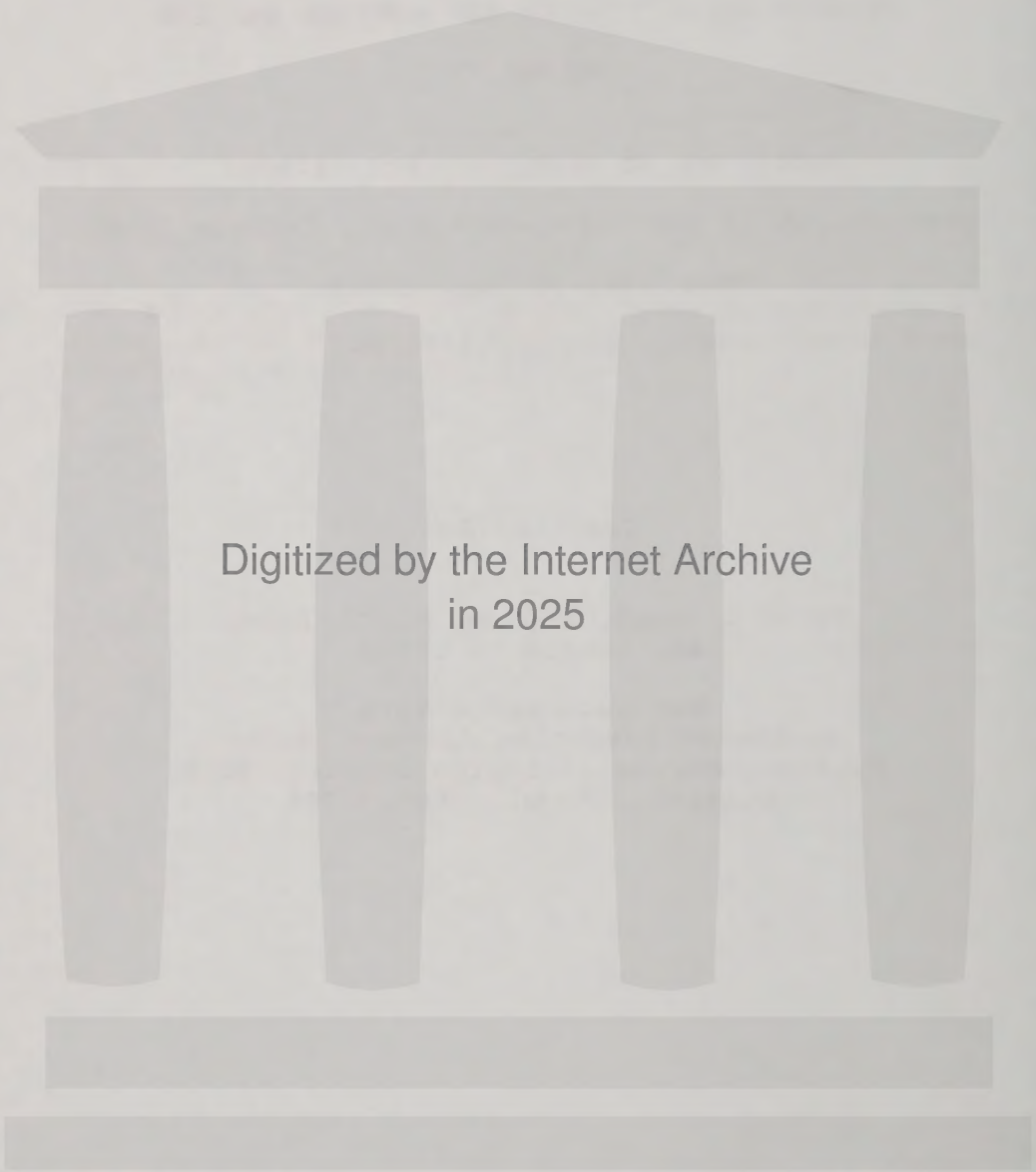
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PREFACE

In recent years, the demand for data and information concerning marine fisheries has greatly increased. To help meet these increased needs in the central and western Pacific areas, the National Marine Fisheries Service's Southwest Fisheries Center initiated the Western Pacific Fishery Information Network (WPACFIN), which assists Pacific island fisheries agencies in upgrading their data collecting, processing, and reporting capabilities. Several agencies are participating in this program: the National Marine Fisheries Service's Southwest Fisheries Center and its Honolulu Laboratory, and the Southwest Region and its Western Pacific Program Office, American Samoa's Department of Marine and Wildlife Resources, the Commonwealth of the Northern Mariana Islands' Division of Fish and Wildlife, Guam's Division of Aquatic and Wildlife Resources, Hawaii's Division of Aquatic Resources, and the Western Pacific Regional Fishery Management Council.

In 1982, these agencies formed a Fisheries Data Coordinating Committee (FDCC) and a FDCC Technical Subcommittee to help guide, coordinate, and monitor all of the many activities being undertaken by each agency to improve their systems. Significant progress has been made by all participating agencies, particularly in the areas of upgrading data collecting and processing systems.

As a major step in improving and coordinating the data reporting and distributing systems of the agencies, in May 1985, the FDCC agreed to begin producing a combined document reporting each island's major fisheries statistics. Production of the document would be the responsibility of the FDCC Technical Subcommittee and would be coordinated by the WPACFIN program manager. Each agency would supply required summaries, graphs, and text for its respective chapter of the report; WPACFIN would combine the chapters and distribute the document as part of the Administrative Report Series of the Southwest Fisheries Center.

This document is the sixth volume in the series "Fishery Statistics of the Western Pacific" and contains summaries of commercial and creel survey fishery landings data for 1989 for American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and Hawaii. The first five volumes of this series contained similar reports for these areas for 1979 through 1988.

CONTENTS

		PAGE
I.	Background	I.1
	Progress	I.1
	Precautions	I.2
	Contents	I.2
	Definitions	I.2
	Graphics	I.3
	II. American Samoa 1989 Fishery Statistics	
	Introduction	II.1
	Data Collecting System	II.1
	Data Processing System	II.3
	Data Reporting System	II.4
	Interpretation of Statistics	II.9
	Tables and Figures	II.10
III.	Commonwealth of the Northern Mariana Islands 1989 Fishery Statistics	
	Introduction	III.1
	Data Collecting System	III.1
	Data Processing System	III.2
	Data Reporting System	III.3
	Tables and Figures	III.5
IV.	Guam 1989 Fishery Statistics	
	Introduction	IV.1
	Data Collecting Systems	IV.1
	Commercial Landings	IV.1
	Creel Surveys	IV.2
	Offshore Creel Survey	IV.3
	Inshore Creel Survey	IV.5
	Data Processing Systems	IV.7
	Commercial Landings	IV.7
	Creel Surveys	IV.7
	Data Reporting Systems	IV.9
	Commercial Landings	IV.9
	Creel Surveys	IV.11
	Interpretation of Statistics	IV.13
	Tables and Figures	IV.15
IV.	State of Hawaii 1989 Fishery Statistics	
	Introduction	V.1
	Data Collecting System	V.1
	Data Processing System	V.2
	Data Reporting System	V.3
	Tables and Figures	V.7

LIST OF AMERICAN SAMOA SUMMARY TABLES

Table	Title	Page
II.1.1	American Samoa 1989 Annual Estimated Commercial Landings	II.10
II.1.2	American Samoa January 1989 Estimated Commercial Landings	II.12
II.1.3	American Samoa February 1989 Estimated Commercial Landings	II.13
II.1.4	American Samoa March 1989 Estimated Commercial Landings	II.14
II.1.5	American Samoa April 1989 Estimated Commercial Landings	II.15
II.1.6	American Samoa May 1989 Estimated Commercial Landings	II.16
II.1.7	American Samoa June 1989 Estimated Commercial Landings	II.17
II.1.8	American Samoa July 1989 Estimated Commercial Landings	II.18
II.1.9	American Samoa August 1989 Estimated Commercial Landings	II.19
II.1.10	American Samoa September 1989 Estimated Commercial Landings	II.20
II.1.11	American Samoa October 1989 Estimated Commercial Landings	II.21
II.1.12	American Samoa November 1989 Estimated Commercial Landings	II.22
II.1.13	American Samoa December 1989 Estimated Commercial Landings	II.23
II.2.1	American Samoa 1989 Annual Manu's Estimated Commercial Landings	II.24
II.2.2	American Samoa January 1989 Manu'a Estimated Commercial Landings	II.25
II.2.3	American Samoa February 1989 Manu'a Estimated Commercial Landings	II.25
II.2.4	American Samoa March 1989 Manu'a Estimated Commercial Landings	II.26
II.2.5	American Samoa April 1989 Manu'a Estimated Commercial Landings	II.26
II.2.6	American Samoa May 1989 Manu'a Estimated Commercial Landings	II.27
II.2.7	American Samoa June 1989 Manu'a Estimated Commercial Landings	II.27
II.2.8	American Samoa July 1989 Manu'a Estimated Commercial Landings	II.28
II.2.9	American Samoa August 1989 Manu'a Estimated Commercial Landings	II.28
II.2.10	American Samoa September 1989 Manu'a Estimated Commercial Landings	II.28

LIST OF AMERICAN SAMOA SUMMARY TABLES (cont.)

Table	Title	Page
II.2.11	American Samoa October 1989 Manu'a Estimated Commercial Landings	II.29
II.2.12	American Samoa November 1989 Manu'a Estimated Commercial Landings	II.30
II.2.13	American Samoa December 1989 Manu'a Estimated Commercial Landings	II.31
II.3.1	Tutuila 1989 Annual Offshore Creel Survey Expansion Summary	II.43
II.3.2	Tutuila 1989 Annual Offshore Creel Survey Species Composition	II.44
II.4.1	Tutuila January 1989 Offshore Creel Survey Expansion Summary	II.45
II.4.2	Tutuila February 1989 Offshore Creel Survey Expansion Summary	II.45
II.4.3	Tutuila March 1989 Offshore Creel Survey Expansion Summary	II.45
II.4.4	Tutuila April 1989 Offshore Creel Survey Expansion Summary	II.46
II.4.5	Tutuila May 1989 Offshore Creel Survey Expansion Summary	II.46
II.4.6	Tutuila June 1989 Offshore Creel Survey Expansion Summary	II.46
II.4.7	Tutuila July 1989 Offshore Creel Survey Expansion Summary	II.47
II.4.8	Tutuila August 1989 Offshore Creel Survey Expansion Summary	II.47
II.4.9	Tutuila September 1989 Offshore Creel Survey Expansion Summary	II.47
II.4.10	Tutuila October 1989 Offshore Creel Survey Expansion Summary	II.48
II.4.11	Tutuila November 1989 Offshore Creel Survey Expansion Summary	II.48
II.4.12	Tutuila December 1989 Offshore Creel Survey Expansion Summary	II.48
II.5.1	Tutuila January 1989 Offshore Creel Survey Species Composition	II.49
II.5.2	Tutuila February 1989 Offshore Creel Survey Species Composition	II.49
II.5.3	Tutuila March 1989 Offshore Creel Survey Species Composition	II.50
II.5.4	Tutuila April 1989 Offshore Creel Survey Species Composition	II.50
II.5.5	Tutuila May 1989 Offshore Creel Survey Species Composition	II.51
II.5.6	Tutuila June 1989 Offshore Creel Survey Species Composition	II.51

LIST OF AMERICAN SAMOA SUMMARY TABLES (cont.)

Table	Title	Page
II.5.7	Tutuila July 1989 Offshore Creel Survey Species Composition	II.52
II.5.8	Tutuila August 1989 Offshore Creel Survey Species Composition	II.53
II.5.9	Tutuila September 1989 Offshore Creel Survey Species Composition	II.53
II.5.10	Tutuila October 1989 Offshore Creel Survey Species Composition	II.54
II.5.11	Tutuila November 1989 Offshore Creel Survey Species Composition	II.54
II.5.12	Tutuila December 1989 Offshore Creel Survey Species Composition	II.55

LIST OF CNMI SUMMARY TABLES

Table	Title	Page
III.1.1	CNMI 1989 Annual Commercial Landings	III.5
III.1.2	CNMI January 1989 Commercial Landings	III.6
III.1.3	CNMI February 1989 Commercial Landings	III.7
III.1.4	CNMI March 1989 Commercial Landings	III.8
III.1.5	CNMI April 1989 Commercial Landings	III.9
III.1.6	CNMI May 1989 Commercial Landings	III.9
III.1.7	CNMI June 1989 Commercial Landings	III.10
III.1.8	CNMI July 1989 Commercial Landings	III.11
III.1.9	CNMI August 1989 Commercial Landings	III.11
III.1.10	CNMI September 1989 Commercial Landings	III.12
III.1.11	CNMI October 1989 Commercial Landings	III.12
III.1.12	CNMI November 1989 Commercial Landings	III.13
III.1.13	CNMI December 1989 Commercial Landings	III.14

LIST OF GUAM SUMMARY TABLES

Table	Title	Page
IV.1.1	Guam 1989 Annual Commercial Landings	IV.15
IV.1.2	Guam January 1989 Commercial Landings	IV.16
IV.1.3	Guam February 1989 Commercial Landings	IV.16
IV.1.4	Guam March 1989 Commercial Landings	IV.17
IV.1.5	Guam April 1989 Commercial Landings	IV.18
IV.1.6	Guam May 1989 Commercial Landings	IV.19
IV.1.7	Guam June 1989 Commercial Landings	IV.19
IV.1.8	Guam July 1989 Commercial Landings	IV.20
IV.1.9	Guam August 1989 Commercial Landings	IV.21

LIST OF GUAM SUMMARY TABLES (cont.)

Table	Title	Page
IV.1.10	Guam September 1989 Commercial Landings	IV.22
IV.1.11	Guam October 1989 Commercial Landings	IV.23
IV.1.12	Guam November 1989 Commercial Landings	IV.24
IV.1.13	Guam December 1989 Commercial Landings	IV.25
IV.2.1	Guam DAWR Annual 1989 Offshore Creel Survey Expansion Summary	IV.38
IV.2.2	Guam DAWR Annual 1989 Offshore Creel Survey Species Composition	IV.38
IV.3.1	Guam DAWR January 1989 Offshore Creel Survey Expansion Summary	IV.40
IV.3.2	Guam DAWR February 1989 Offshore Creel Survey Expansion Summary	IV.40
IV.3.3	Guam DAWR March 1989 Offshore Creel Survey Expansion Summary	IV.40
IV.3.4	Guam DAWR April 1989 Offshore Creel Survey Expansion Summary	IV.41
IV.3.5	Guam DAWR May 1989 Offshore Creel Survey Expansion Summary	IV.41
IV.3.6	Guam DAWR June 1989 Offshore Creel Survey Expansion Summary	IV.41
IV.3.7	Guam DAWR July 1989 Offshore Creel Survey Expansion Summary	IV.42
IV.3.8	Guam DAWR August 1989 Offshore Creel Survey Expansion Summary	IV.42
IV.3.9	Guam DAWR September 1989 Offshore Creel Survey Expansion Summary	IV.42
IV.3.10	Guam DAWR October 1989 Offshore Creel Survey Expansion Summary	IV.43
IV.3.11	Guam DAWR November 1989 Offshore Creel Survey Expansion Summary	IV.43
IV.3.12	Guam DAWR December 1989 Offshore Creel Survey Expansion Summary	IV.43
IV.4.1	Guam DAWR January 1989 Offshore Creel Survey Species Composition	IV.44
IV.4.2	Guam DAWR February 1989 Offshore Creel Survey Species Composition	IV.45
IV.4.3	Guam DAWR March 1989 Offshore Creel Survey Species Composition	IV.46
IV.4.4	Guam DAWR April 1989 Offshore Creel Survey Species Composition	IV.47
IV.4.5	Guam DAWR May 1989 Offshore Creel Survey Species Composition	IV.48
IV.4.6	Guam DAWR June 1989 Offshore Creel Survey Species Composition	IV.49
IV.4.7	Guam DAWR July 1989 Offshore Creel Survey Species Composition	IV.50

LIST OF GUAM SUMMARY TABLES (cont.)

Table	Title	Page
IV.4.8	Guam DAWR August 1989 Offshore Creel Survey Species Composition	IV.51
IV.4.9	Guam DAWR September 1989 Offshore Creel Survey Species Composition	IV.52
IV.4.10	Guam DAWR October 1989 Offshore Creel Survey Species Composition	IV.53
IV.4.11	Guam DAWR November 1989 Offshore Creel Survey Species Composition	IV.54
IV.4.12	Guam DAWR December 1989 Offshore Creel Survey Species Composition	IV.55
IV.5.1	1989 Guam International Fishing Derby Summary Reports	IV.56
IV.6.1	Guam DAWR Annual 1989 Day Inshore Creel Survey Expansion Summary	IV.57
IV.6.2	Guam DAWR Annual 1989 Night Inshore Creel Survey Expansion Summary	IV.57
IV.7.1	Guam DAWR Annual 1989 Day Inshore Creel Survey Species Composition	IV.58
IV.7.2	Guam DAWR Annual 1989 Night Inshore Creel Survey Species Composition	IV.59
IV.7.3	Guam DAWR Annual 1989 Combined Day and Night Inshore Creel Survey Species Composition	IV.60
IV.7.4	Guam DAWR Annual 1989 Combined Offshore and Inshore Creel Survey Species Composition	IV.61

LIST OF HAWAII SUMMARY TABLES

Table	Title	Page
V.1.1	Hawaii 1989 Annual Commercial Landings	V.8
V.1.2	Hawaii 1989 Commercial Landings Not Sold	V.10
V.1.3	Hawaii January 1989 Commercial Landings	V.12
V.1.4	Hawaii February 1989 Commercial Landings	V.14
V.1.5	Hawaii March 1989 Commercial Landings	V.16
V.1.6	Hawaii April 1989 Commercial Landings	V.18
V.1.7	Hawaii May 1989 Commercial Landings	V.20
V.1.8	Hawaii June 1989 Commercial Landings	V.22
V.1.9	Hawaii July 1989 Commercial Landings	V.24
V.1.10	Hawaii August 1989 Commercial Landings	V.26
V.1.11	Hawaii September 1989 Commercial Landings	V.28
V.1.12	Hawaii October 1989 Commercial Landings	V.30
V.1.13	Hawaii November 1989 Commercial Landings	V.32
V.1.14	Hawaii December 1989 Commercial Landings	V.34

LIST OF AMERICAN SAMOA FIGURES

Table	Title	Page
II.1.1	American Samoa 1989 Fisheries Categories: Pelagic, Bottom, Reef, and Other	II.32
II.1.2	American Samoa 1989 Monthly Landings of Tunas, PMUS, and BMUS	II.32
II.1.3	American Samoa 1989 Monthly Landings of Wahoo, Mahimahi, and Billfish	II.33
II.1.4	American Samoa 1989 Monthly Landings of Skipjack, Yellowfin, and Other Tunas	II.33
II.2.1	American Samoa 1982-1989 Average Monthly Landings of Tunas, PMUS, and BMUS	II.34
II.2.2	American Samoa 1982-1989 Average Monthly Landings of Wahoo and Mahimahi	II.34
II.2.3	American Samoa 1982-1989 Average Monthly Landings of Blue Marlin and Sailfish	II.35
II.2.4	American Samoa 1982-1989 Average Monthly Landings of Skipjack, Yellowfin, and Other Tunas	II.35
II.2.5	American Samoa 1982-1989 Average Monthly Landings of BMUS, Onaga, and Ehu	II.36
II.3.1	American Samoa 1982-1989 Annual Trends of Fisheries Categories: Pelagic, Bottom, Reef, and Other	II.36
II.3.2	American Samoa 1982-1989 Annual Trends of Total Commercial Landings	II.37
II.3.3	American Samoa 1982-1989 Annual Trends of Tunas, PMUS, and BMUS Landings	II.37
II.3.4	American Samoa 1982-1989 Annual Trends of Wahoo, Mahimahi, and Billfish	II.38
II.3.5	American Samoa 1982-1989 Annual Trends of Skipjack, Yellowfin, and Other Tunas	II.38
II.4.1	American Samoa 1982-1989 Landings of Wahoo	II.39
II.4.2	American Samoa 1982-1989 Landings of Mahimahi	II.39
II.4.3	American Samoa 1982-1989 Landings of Blue Marlin	II.40
II.4.4	American Samoa 1982-1989 Landings of Sailfish	II.40
II.4.5	American Samoa 1982-1989 Landings of Skipjack Tuna	II.41
II.4.6	American Samoa 1982-1989 Landings of Yellowfin Tuna	II.41
II.4.7	American Samoa 1982-1989 Landings of Onaga	II.42
II.4.8	American Samoa 1982-1989 Landings of Ehu	II.42

LIST OF AMERICAN SAMOA FIGURES (cont.)

Table	Title	Page
II.5.1	American Samoa 1989 Tutuila's Expanded Monthly Catch by Method	II.56
II.5.2	American Samoa 1989 Tutuila's Expanded Monthly Effort by Method	II.56
II.5.3	American Samoa 1986-1989 Tutuila's Annual Catch and Effort	II.57

LIST OF CNMI FIGURES

Table	Title	Page
III.1.1	CNMI 1989 Fisheries Categories: Pelagic, Bottom, Reef, and Other	III.15
III.1.2	CNMI 1989 Monthly Landings of Tunas, PMUS, and BMUS	III.15
III.1.3	CNMI 1989 Monthly Landings of Wahoo, Mahimahi, and Billfish	III.16
III.1.4	CNMI 1989 Monthly Landings of Skipjack, Yellowfin, and Other Tunas	III.16
III.2.1	CNMI 1979-1989 Average Monthly Landings of Tunas, PMUS, and BMUS	III.17
III.2.2	CNMI 1979-1989 Average Monthly Landings of Wahoo and Mahimahi	III.17
III.2.3	CNMI 1979-1989 Average Monthly Landings of Blue Marlin And Sailfish	III.18
III.2.4	CNMI 1979-1989 Average Monthly Landings of Skipjack, Yellowfin, and Other Tunas	III.18
III.2.5	CNMI 1979-1989 Average Monthly Landings of BMUS, Emperor, and Grouper	III.19
III.3.1	CNMI 1979-1989 Annual Trend of Fisheries Categories: Pelagic, Bottom, Reef, Other	III.19
III.3.2	CNMI 1979-1989 Annual Trends of Total Commercial Landings	III.20
III.3.3	CNMI 1979-1989 Annual Trends of Tunas, PMUS, and BMUS Landings	III.20
III.3.4	CNMI 1979-1989 Annual Trends of Wahoo, Mahimahi, and Billfish	III.21
III.3.5	CNMI 1979-1989 Annual Trends of Skipjack, Yellowfin, and Other Tunas	III.21
III.4.1	CNMI 1979-1989 Landings of Wahoo	III.22
III.4.2	CNMI 1979-1989 Landings of Mahimahi	III.22

LIST OF CNMI FIGURES (cont.)

Table	Title	Page
III.4.3	CNMI 1979-1989 Landings of Marlin	III.23
III.4.4	CNMI 1979-1989 Landings of Sailfish	III.23
III.4.5	CNMI 1979-1989 Landings of Skipjack Tuna	III.24
III.4.6	CNMI 1979-1989 Landings of Yellowfin Tuna	III.24
III.4.7	CNMI 1979-1989 Landings of Emperor	III.25
III.4.8	CNMI 1979-1989 Landings of Grouper	III.25

LIST OF GUAM FIGURES

Table	Title	Page
IV.1.1	Guam 1989 Fisheries Categories: Pelagic, Bottom, Reef, and Other	IV.26
IV.1.2	Guam 1989 Monthly Landings of Tunas, PMUS, and BMUS	IV.26
IV.1.3	Guam 1989 Monthly Landings of Wahoo, Mahimahi, and Billfish	IV.27
IV.1.4	Guam 1989 Monthly Landings of Skipjack, Yellowfin, and Other Tunas	IV.27
IV.2.1	Guam 1979-1989 Average Monthly Landings of Tunas, PMUS, and BMUS	IV.28
IV.2.2	Guam 1979-1989 Average Monthly Landings of Wahoo, and Mahimahi	IV.28
IV.2.3	Guam 1979-1989 Average Monthly Landings of Marlin, Spearfish, and Sailfish	IV.29
IV.2.4	Guam 1979-1989 Average Monthly Landings of Skipjack, Yellowfin, and Other Tunas	IV.29
IV.2.5	Guam 1979-1989 Average Monthly Landings of BMUS, Grouper, and Emperor	IV.30
IV.3.1	Guam 1979-1989 Annual Trend of Fisheries Categories: Pelagic, Bottom, Reef, and Other	IV.30
IV.3.2	Guam 1979-1989 Annual Trends of Total Commercial Landings	IV.31
IV.3.3	Guam 1979-1989 Annual Trends of Tunas, PMUS, and BMUS Landings	IV.31
IV.3.4	Guam 1979-1989 Annual Trends of Wahoo, Mahimahi, and Billfish	IV.32
IV.3.5	Guam 1979-1989 Annual Trends of Skipjack, Yellowfin, and Other Tunas	IV.32

LIST OF GUAM FIGURES (cont.)

Table	Title	Page
IV.4.1	Guam 1979-1989 Monthly Landings of Wahoo	IV.33
IV.4.2	Guam 1979-1989 Monthly Landings of Mahimahi	IV.33
IV.4.3	Guam 1979-1989 Monthly Landings of Marlin	IV.34
IV.4.4	Guam 1979-1989 Monthly Landings of Sailfish	IV.34
IV.4.5	Guam 1979-1989 Monthly Landings of Spearfish	IV.35
IV.4.6	Guam 1979-1989 Monthly Landings of Skipjack Tuna	IV.35
IV.4.7	Guam 1979-1989 Monthly Landings of Yellowfin Tuna	IV.36
IV.4.8	Guam 1979-1989 Monthly Landings of Emperor	IV.36
IV.4.9	Guam 1979-1989 Monthly Landings of Grouper	IV.37
IV.5.1	Guam 1989 Catch by Method: Troll, Bottom, and Other	IV.62
IV.5.2	Guam 1989 Effort by Method: Troll, Bottom, and Other	IV.62
IV.6.1	Guam 1979-1989 Annual Catch by Method: Troll, Bottom, and Other	IV.63
IV.6.2	Guam 1979-1989 Annual Effort by Method: Troll, Bottom, and Other	IV.63
IV.7.1	Guam 1983-1989 Inshore Total Catch and Effort	IV.64
IV.7.2	Guam 1983-1989 Offshore and Inshore Total Catch	IV.64

LIST OF HAWAII FIGURES

Table	Title	Page
V.1.1	Hawaii 1989 Fisheries Categories: Pelagic, Bottom, Reef, and Other	V.36
V.1.2	Hawaii 1989 Monthly Landings of Tunas, PMUS, and BMUS	V.36
V.1.3	Hawaii 1989 Monthly Landings of Wahoo, Mahimahi, and Billfish	V.37
V.1.4	Hawaii 1989 Monthly Landings of Skipjack, Yellowfin, and Other Tunas	V.37

LIST OF HAWAII FIGURES (cont.)

Table	Title	Page
V.2.1	Hawaii 1979-1989 Average Monthly Landings of Tunas, PMUS, and BMUS	V.38
V.2.2	Hawaii 1979-1989 Average Monthly Landings of Wahoo and Mahimahi	V.38
V.2.3	Hawaii 1979-1989 Average Monthly Landings of Marlin Species	V.39
V.2.4	Hawaii 1979-1989 Average Monthly Landings of Swordfish, Sailfish, and Spearfish	V.39
V.2.5	Hawaii 1979-1989 Average Monthly Landings of Skipjack, Yellowfin, and Other Tunas	V.40
V.2.6	Hawaii 1979-1989 Average Monthly Landings of BMUS, Onaga, and Opakapaka	V.40
V.2.7	Hawaii 1979-1989 Average Monthly Landings of BMUS, Ehu, and Uku	V.41
V.3.1	Hawaii 1979-1989 Annual Trend of Fisheries Categories Pelagic, Bottom, Reef, and Other	V.41
V.3.2	Hawaii 1979-1989 Annual Trends of Total Commercial Landings	V.42
V.3.3	Hawaii 1979-1989 Annual Trends of Tunas, PMUS, and BMUS Landings	V.42
V.3.4	Hawaii 1979-1989 Annual Trends of Wahoo, Mahimahi, and Billfish	V.43
V.3.5	Hawaii 1979-1989 Annual Trends of Skipjack, Yellowfin, and Other Tunas	V.43
V.4.1	Hawaii 1979-1989 Landings of Wahoo	V.44
V.4.2	Hawaii 1979-1989 Landings of Mahimahi	V.44
V.4.3	Hawaii 1979-1989 Landings of Blue Marlin	V.45
V.4.4	Hawaii 1979-1989 Landings of Black Marlin	V.45
V.4.5	Hawaii 1979-1989 Landings of Striped Marlin	V.46
V.4.6	Hawaii 1979-1989 Landings of Sailfish	V.46
V.4.7	Hawaii 1979-1989 Landings of Shortnose Spearfish	V.47
V.4.8	Hawaii 1979-1989 Landings of Broadbill Swordfish	V.47
V.4.9	Hawaii 1979-1989 Landings of Skipjack Tuna	V.48
V.4.10	Hawaii 1979-1989 Landings of Yellowfin Tuna	V.48
V.4.11	Hawaii 1979-1989 Landings of Onaga	V.49
V.4.12	Hawaii 1979-1989 Landings of Opakapaka	V.49
V.4.13	Hawaii 1979-1989 Landings of Ehu	V.50
V.4.14	Hawaii 1979-1989 Landings of Uku	V.50

BACKGROUND

This report has been compiled by governmental fisheries agencies of several islands in the central and western Pacific area in a cooperative and continuing effort to improve the availability and dissemination of fisheries information. The data contained herein have been collected, computerized, edited, and processed by agencies participating in the Western Pacific Fishery Information Network (WPACFIN), including American Samoa's Department of Marine and Wildlife Resources (DMWR), the Commonwealth of the Northern Mariana Islands' (CNMI) Division of Fish and Wildlife (DFW), Guam's Division of Aquatic and Wildlife Resources (DAWR), Hawaii's Division of Aquatic Resources (HDAR) and the Southwest Fisheries Center's (SWFC) Honolulu Laboratory, National Marine Fisheries Service (NMFS). The data summaries and graphs contained in this document were prepared by WPACFIN staff at the Honolulu Laboratory from data collected by WPACFIN or provided by these agencies. Data from DMWR, DFW, and DAWR were supplied on floppy diskettes in established WPACFIN data base formats, whereas data on the Guam commercial fisheries were collected on forms provided to fish wholesalers by WPACFIN. Data for Hawaii were provided by HDAR on computer tape. Once data from all of these agencies were put into the proper format on the central WPACFIN computer and appropriate edit and verification procedures completed, summary reports and files were produced using software developed specifically for this purpose. Graphs were produced using commercially available software and a lazerjet printer.

PROGRESS

In 1981, when WPACFIN began assisting agencies in improving their data collecting and processing systems, only the State of Hawaii had computerized processing. By mid-1982, fisheries offices in American Samoa, Guam, and the CNMI had implemented computerized processing on microcomputers supplied by WPACFIN. Since that time, these agencies have made many significant improvements to their data collecting systems and have established sound automated data processing systems. Most agencies can now provide fishery statistics to WPACFIN within 45 days of the date of collection. The HDAR has also improved its systems in recent years and has significantly reduced the lag time in data processing from about 2.5 years to less than 1 year. It has also improved the procedures used for editing, updating, and processing Hawaii's data. Implementation of additional planned improvements could reduce the lag time to about 6 months.

PRECAUTIONS

Data collecting and processing systems vary greatly among Pacific island fisheries agencies. Although much standardization has taken place and is continuing, there remain many unique aspects of each island's systems based on local needs and capabilities. When using summaries contained in this report, especially if making comparisons, one should keep in mind the nature of the systems used to produce the data. For instance, Hawaii's data are based on mandatory monthly reporting by licensed commercial fishermen, CNMI's data are based on voluntary monthly reporting of fish buyers using government- provided invoices, Guam's data are from WPACFIN-sponsored voluntary reporting by major commercial dealers and DAWR- operated creel survey sampling and data expansion programs, and American Samoa's data are based on an integration of almost daily interviews of fishermen and a creel survey and data expansion program similar to Guam's. Each system has advantages and disadvantages, and the user should be aware of them when comparing or interpreting data.

The user should also be aware that species assemblages vary among island groups, as do cultural preferences and principal fishing techniques. Population size is of particular importance when making interpretations of the relative value and importance of the fisheries. To help the user make these value judgments, more detailed explanations of the data collecting and processing systems are provided in each island's section of this report.

CONTENTS

This document is divided into sections by island group. Each section contains reports on the monthly and annual landings by species or species groups for the commercial fleet. The sections for American Samoa and Guam also contain estimates of total catch and effort of all fisheries including recreational and subsistence fishing activities. These estimates and their associated confidence limits were generated by computer-based data expansion systems using sample fishery data collected by creel survey programs. Commercial landings for American Samoa were calculated based on information gathered during the offshore creel survey sampling program. Two sets of annual summaries are included for Hawaii, one each for commercial landings that were sold and not sold.

Definitions

In addition to the description of the systems and the monthly and annual reports, each section contains graphs of some of the summary fishery statistics of particular interest or importance to participating WPACFIN agencies. For purposes of graphical presentation of the data, several categories have been defined for each island's fisheries. Because of differences in

reporting systems and capabilities among the islands, species contained within each category may vary, but all categories are documented in each island's section. Overlap exists among some of the categories used for different graphs. Categories used in the graphs include the following:

1. Fisheries Categories - These are combinations of species of similar ecological types, specifically, pelagic, bottom fish, reef fish, and "other." "Other" includes groups that generally traverse these categories, such as sharks and certain jacks, or are not typically included in these groups, such as mullet and milkfish.

2. Pelagic Management Unit Species (PMUS) - Defined in the Fishery Management Plan for pelagic species to include the billfishes, wahoo, mahimahi, and sharks.

3. Bottom Fish Management Unit Species (BMUS) - Defined as the species of initial importance in the Fishery Management Plan for bottom fish and seamount fisheries, including the major deepwater snapper, grouper, emperor, and certain jacks.

4. Tunas - Predominantly skipjack and yellowfin tunas in all areas, but also including most other tuna species and excluding wahoo.

5. Other Tunas - All tunas as defined above, but excluding skipjack and yellowfin tunas.

6. Billfish - Combination of all marlin, sailfish, spearfish, and swordfish species.

7. Other Methods - In the American Samoa and Guam sections, fishing methods other than trolling and bottom fishing are combined into this single "other" category for certain graphs.

Graphics

A minimum of four types of graphs are provided with each island's data. The chapters for American Samoa and Guam have an additional type of graphics on catch and effort from their creel survey data. Type I graphs present summary charts of the major species and species groups for 1989. Type II graphs are seasonality plots for the major species or species groups, showing the average weight landed during each month for all years combined. Type III graphs are based on annual summary statistics and help visualize the variability among years. Type IV graphs are plots of monthly landings of some of the major commercially important species and document fluctuations in landings of these species over the entire time series. Type V graphs are based on creel survey data and include plots of catch and effort by

fishing method plus a combination of several of the types I-IV graphs.

I. Monthly graphs for each year's data including:

- A. Major fisheries categories
- B. Tunas, PMUS, and BMUS
- C. Wahoo, mahimahi, and billfish
- D. Skipjack, yellowfin, and other tunas

II. Plots of average monthly landings for:

- A. Tunas, PMUS, and BMUS
- B. Wahoo and mahimahi
- C. Billfish species:
  1. Marlin and sailfish - American Samoa and CNMI
  2. Blue marlin, black marlin, and striped marlin - Hawaii
  3. Sailfish, shortbill spearfish, and swordfish - Hawaii
- D. Skipjack, yellowfin, and other tunas
- E. BMUS and the most important bottom fish species
  1. BMUS, ehu, and onaga - American Samoa
  2. BMUS, emperor, and grouper - CNMI and Guam
  3. BMUS, onaga, and opakapaka - Hawaii
  4. BMUS, ehu, and uku - Hawaii

III. Graphs of annual summary statistics for:

- A. Major fisheries categories
- B. Total commercial landings - pounds and dollars
- C. Tunas, PMUS, and BMUS
- D. Wahoo, mahimahi, and billfish
- E. Skipjack, yellowfin, and other tunas

IV. Graphs of monthly landings over the entire time series for the following major species:

- A. Wahoo - All four areas
- B. Mahimahi - All four areas
- C. Blue marlin - All four areas
- D. Black marlin - Hawaii
- E. Striped marlin - Hawaii
- F. Sailfish - American Samoa, Guam, and Hawaii
- G. Shortbill spearfish - Guam and Hawaii
- H. Swordfish - Hawaii
- I. Skipjack tuna - All four areas
- J. Yellowfin tuna - All four areas
- K. Opakapaka - Hawaii
- L. Onaga - American Samoa and Hawaii
- M. Uku - Hawaii
- N. Ehu - American Samoa and Hawaii
- O. Emperors - CNMI and Guam
- P. Grouper - CNMI and Guam

V. Graphs of certain statistics generated by creel surveys for American Samoa and Guam

A. Offshore monthly catch by method
B. Offshore monthly effort by method
C. Offshore annual catch by method
D. Offshore annual effort by method
E. Inshore Total Catch and Effort
F. Offshore and Inshore Total Catch

American Samoa

Fishery Statistics 1989

AMERICAN SAMOA 1989 FISHERY STATISTICS

Compiled by

American Samoa
Department of Marine and Wildlife Resources
and the
Western Pacific Fishery Information Network

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CONTENTS

	Page
Introduction	II.1
Data Collecting System	II.1
Data Processing System	II.3
Data Reporting System	II.4
Interpretation of Statistics	II.9
Tables and Figures	II.10

LIST OF AMERICAN SAMOA SUMMARY TABLES

Table	Title	Page
II.1.1	American Samoa 1989 Annual Estimated Commercial Landings	II.10
II.1.2	American Samoa January 1989 Estimated Commercial Landings	II.12
II.1.3	American Samoa February 1989 Estimated Commercial Landings	II.13
II.1.4	American Samoa March 1989 Estimated Commercial Landings	II.14
II.1.5	American Samoa April 1989 Estimated Commercial Landings	II.15
II.1.6	American Samoa May 1989 Estimated Commercial Landings	II.16
II.1.7	American Samoa June 1989 Estimated Commercial Landings	II.17
II.1.8	American Samoa July 1989 Estimated Commercial Landings	II.18
II.1.9	American Samoa August 1989 Estimated Commercial Landings	II.19
II.1.10	American Samoa September 1989 Estimated Commercial Landings	II.20
II.1.11	American Samoa October 1989 Estimated Commercial Landings	II.21
II.1.12	American Samoa November 1989 Estimated Commercial Landings	II.22
II.1.13	American Samoa December 1989 Estimated Commercial Landings	II.23
II.2.1	American Samoa 1989 Annual Manu'a Estimated Commercial Landings	II.24
II.2.2	American Samoa January 1989 Manu'a Estimated Commercial Landings	II.25
II.2.3	American Samoa February 1989 Manu'a Estimated Commercial Landings	II.25
II.2.4	American Samoa March 1989 Manu'a Estimated Commercial Landings	II.26
II.2.5	American Samoa April 1989 Manu'a Estimated Commercial Landings	II.26
II.2.6	American Samoa May 1989 Manu'a Estimated Commercial Landings	II.27
II.2.7	American Samoa June 1989 Manu'a Estimated Commercial Landings	II.27
II.2.8	American Samoa July 1989 Manu'a Estimated Commercial Landings	II.28
II.2.9	American Samoa August 1989 Manu'a Estimated Commercial Landings	II.28
II.2.10	American Samoa September 1989 Manu'a Estimated Commercial Landings	II.28

LIST OF AMERICAN SAMOA SUMMARY TABLES (cont.)

Table	Title	Page
II.2.11	American Samoa October 1989 Manu'a Estimated Commercial Landings	II.29
II.2.12	American Samoa November 1989 Manu'a Estimated Commercial Landings	II.30
II.2.13	American Samoa December 1989 Manu'a Estimated Commercial Landings	II.31
II.3.1	Tutuila 1989 Annual Offshore Creel Survey Expansion Summary	II.43
II.3.2	Tutuila 1989 Annual Offshore Creel Survey Species Composition	II.44
II.4.1	Tutuila January 1989 Offshore Creel Survey Expansion Summary	II.45
II.4.2	Tutuila February 1989 Offshore Creel Survey Expansion Summary	II.45
II.4.3	Tutuila March 1989 Offshore Creel Survey Expansion Summary	II.45
II.4.4	Tutuila April 1989 Offshore Creel Survey Expansion Summary	II.46
II.4.5	Tutuila May 1989 Offshore Creel Survey Expansion Summary	II.46
II.4.6	Tutuila June 1989 Offshore Creel Survey Expansion Summary	II.46
II.4.7	Tutuila July 1989 Offshore Creel Survey Expansion Summary	II.47
II.4.8	Tutuila August 1989 Offshore Creel Survey Expansion Summary	II.47
II.4.9	Tutuila September 1989 Offshore Creel Survey Expansion Summary	II.47
II.4.10	Tutuila October 1989 Offshore Creel Survey Expansion Summary	II.48
II.4.11	Tutuila November 1989 Offshore Creel Survey Expansion Summary	II.48
II.4.12	Tutuila December 1989 Offshore Creel Survey Expansion Summary	II.48
II.5.1	Tutuila January 1989 Offshore Creel Survey Species Composition	II.49
II.5.2	Tutuila February 1989 Offshore Creel Survey Species Composition	II.49
II.5.3	Tutuila March 1989 Offshore Creel Survey Species Composition	II.50

LIST OF AMERICAN SAMOA SUMMARY TABLES (cont.)

Table	Title	Page
II.5.4	Tutuila April 1989 Offshore Creel Survey Species Composition	II.50
II.5.5	Tutuila May 1989 Offshore Creel Survey Species Composition	II.51
II.5.6	Tutuila June 1989 Offshore Creel Survey Species Composition	II.51
II.5.7	Tutuila July 1989 Offshore Creel Survey Species Composition	II.52
II.5.8	Tutuila August 1989 Offshore Creel Survey Species Composition	II.53
II.5.9	Tutuila September 1989 Offshore Creel Survey Species Composition	II.53
II.5.10	Tutuila October 1989 Offshore Creel Survey Species Composition	II.54
II.5.11	Tutuila November 1989 Offshore Creel Survey Species Composition	II.54
II.5.12	Tutuila December 1989 Offshore Creel Survey Species Composition	II.55

LIST OF AMERICAN SAMOA FIGURES

Table	Title	Page
II.1.1	American Samoa 1989 Fisheries Categories: Pelagic, Bottom, Reef, and Other	II.32
II.1.2	American Samoa 1989 Monthly Landings of Tunas, PMUS, and BMUS	II.32
II.1.3	American Samoa 1989 Monthly Landings of Wahoo, Mahimahi, and Billfish	II.33
II.1.4	American Samoa 1989 Monthly Landings of Skipjack, Yellowfin, and Other Tunas	II.33
II.2.1	American Samoa 1982-1989 Average Monthly Landings of Tunas, PMUS, and BMUS	II.34
II.2.2	American Samoa 1982-1989 Average Monthly Landings of Wahoo and Mahimahi	II.34
II.2.3	American Samoa 1982-1989 Average Monthly Landings of Blue Marlin and Sailfish	II.35
II.2.4	American Samoa 1982-1989 Average Monthly Landings of Skipjack, Yellowfin, and Other Tunas	II.35
II.2.5	American Samoa 1982-1989 Average Monthly Landings of BMUS, Onaga, and Ehu	II.36
II.3.1	American Samoa 1982-1989 Annual Trend of Fisheries Categories: Pelagic, Bottom, Reef, and Other	II.36
II.3.2	American Samoa 1982-1989 Annual Trends of Total Commercial Landings	II.37
II.3.3	American Samoa 1982-1989 Annual Trends of Tunas, PMUS, and BMUS Landings	II.37
II.3.4	American Samoa 1982-1989 Annual Trends of Wahoo, Mahimahi, and Billfish	II.38
II.3.5	American Samoa 1982-1989 Annual Trends of Skipjack, Yellowfin, and Other Tunas	II.38
II.4.1	American Samoa 1982-1989 Landings of Wahoo	II.39
II.4.2	American Samoa 1982-1989 Landings of Mahimahi	II.39
II.4.3	American Samoa 1982-1989 Landings of Blue Marlin	II.40
II.4.4	American Samoa 1982-1989 Landings of Sailfish	II.40
II.4.5	American Samoa 1982-1989 Landings of Skipjack Tuna	II.41
II.4.6	American Samoa 1982-1989 Landings of Yellowfin Tuna	II.41

LIST OF AMERICAN SAMOA FIGURES (cont.)

Table	Title	Page
II.4.7	American Samoa 1982-1989 Landings of Onaga	II.42
II.4.8	American Samoa 1982-1989 Landings of Ehu	II.42
II.5.1	American Samoa 1989 Tutuila's Monthly Catch by Method	II.56
II.5.2	American Samoa 1989 Tutuila's Monthly Effort by Method	II.56
II.5.3	American Samoa 1986-1989 Tutuila's Annual Catch and Effort	II.57

AMERICAN SAMOA 1989 FISHERY STATISTICS

INTRODUCTION

American Samoa (approximately lat. 14° S, long. 170° W) is composed of the major island of Tutuila, where about 87% of the total population of 35,000 live; Aunu'u, a small island less than 1 mile off Tutuila's southeast shore; the Manu'a Islands of Ofu, Olesaga, and Ta'u, located about 105 km (65 miles) east of Tutuila and having about 4,300 residents; the uninhabited Rose Atoll, some 290 km (180 miles) east of Tutuila; and Swain's Island about 350 km (220 miles) north of Tutuila, where approximately 20 people live. The American Samoa Department of Marine and Wildlife Resources (DMWR), formerly the Office of Marine Resources, located in Pago Pago on Tutuila, has been collecting commercial fisheries data from the local fleet on Tutuila since the early 1970's and from the Manu'a Islands since 1983. Most data collected over the years have been from the commercial fleet, but beginning in October 1985, DMWR's data collection programs were modified to include data on recreational and subsistence fisheries as well.

The domestic fisheries of American Samoa are typically small boat, one-day fisheries. Although one domestic longliner operated for a few years, the majority of the fleet is composed of two types of 28- to 29-foot outboard engine powered catamarans called alias and manta cats. During 1989, 50 boats were sampled, 43 from Tutuila and 7 from the Manu'a Islands. Fishing is mostly done by trolling and bottom fishing methods, and the majority of the catch is sold locally, but some is exported to Hawaii. During 1989, on average, trips on boats from Tutuila had three-man crews, fished 8 hours, and caught a little over 100 pounds of fish.

DATA COLLECTING SYSTEM

The major method used by DMWR for obtaining catch statistics has always been interviewing fishermen at the end of their trips. Before October 1985, the DMWR data collectors kept records of as much commercial fishing activity as possible and routinely obtained interviews from fishermen as often as possible. This method of data collection provided accurate data on the commercial fleet for the trips where interviews were conducted, but was very labor intensive, did not cover all trips, and intentionally excluded the recreational and subsistence fisheries. Therefore, in October 1985, a new sampling program was implemented on Tutuila to provide better coverage and statistics for all boat-based fisheries. The new sampling methods were not implemented in the Manu'a Islands because the fishing fleet is centrally located and is small enough that statistics were being collected for nearly every trip.

The new sampling program for Tutuila was based on a survey design that had been used in Guam for about 4 years. This systematic, random sampling program stratifies sampling by type of day, either weekday or weekend-holiday. For the new program, DMWR staff normally sample 2 weekdays and 1 weekend-holiday per week. In addition, they obtain as many interviews as possible on their "off days" to maintain as much overall coverage of the fisheries as possible. During official survey days, counts of total participation are collected to facilitate expansion of the survey data to estimates of total catch and effort for Tutuila. Unless contrary information is available, a boat is assumed to be fishing if it is "out," as evidenced by its trailer at a boat ramp or being missing from its normal berthing area. Tutuila is divided into six areas, five of which are sampled. Presumably, fishing activity and success rate of boats in the non-sampled area are similar to those in the sampled areas. Further assumptions are that information given by the fishermen during the interview is accurate and that the fishermen interviewed are representative of the entire fishing population.

Survey data are collected in the field on interview log sheets and returned to the DMWR office for editing. The following information is collected for each interview:

* Date
* Type of day
* Time
* Boat name
  Captain or boat owner's name
* Method of fishing
* Disposition of catch
* Species caught
  Number of pieces for each species
* Weight in pounds for each species
  Price per pound for each species
  Area fished
* Home island
  Number of trips since last interview
* Total trip weight in pounds
  Total hours fished (trip length)
  Number of fishermen
  Number of gear used

It is not always possible for the interviewer to obtain information on all items listed. However, the ones marked with an asterisk (*) are considered essential for data expansion purposes. The "TIME" field is used to distinguish between interviews collected on survey days versus "off days." Only data collected on official survey days are used in the data expansion process. Identification and weight of each species are often not obtainable; in which case, a code for species groupings (e.g., miscellaneous bottom fish) is used.

DATA PROCESSING SYSTEM

Interview forms are returned to the office, edited, coded, and entered into computerized databases--the commercial landings database for data collected before October 1985, and the offshore creel survey database for data collected since then. Edit and summary reports are produced to help verify that the data were entered correctly. The creel survey databases are then translated into standard record formats to be used by the American Samoa Offshore Expansion System (ASOES), programmed by WPACFIN specifically for DMWR. As data are converted into ASOES formats, additional error checks are performed by the computer to make sure only valid information enters the expansion system. The ASOES is a menu-driven system that steps the user through a series of processes that summarize creel survey data to produce catch and effort expansion and species composition files and reports. Typically 1 month of data is processed at a time, although the system allows for processing broader time increments of data.

The expansion system generates estimates of daily catch, effort, and participation for each fishing method. These daily estimates are considered measurements of the Tutuila fisheries for that day. Average weekday and weekend-holiday estimates and their associated variances or confidence intervals are created from individual daily measurements. These are weighted by the number of each type of day in the month, or other timespan being expanded, and multiplied by proportionality constants that adjust for percent coverage to produce estimates of total catch, effort, and participation along with their confidence intervals. Percent species composition by weight is calculated from the sampled catch and used to create estimates of total landings by species by multiplying the sampled percent by the expanded estimated catch. All steps in the expansion process are stratified by fishing method. The ASOES produces reports and files of the final totals for all important catch and effort statistics. These files are later used to produce the reports contained in this document. On a quarterly basis, copies of the DMWR data bases are sent to the Honolulu Laboratory for updating the central WPACFIN files.

At the Honolulu Laboratory, the data are translated into different formats and transferred to the central computer for further editing, verification, and processing before generation of summary reports. Because DMWR changed their data collecting systems during 1985, new processing procedures were established by WPACFIN to standardize reports as much as possible to facilitate comparisons between years. Data collected before October 1985 were adjusted upward by the percent coverage to account for missed trips. The offshore creel survey data collected since October 1985 were expanded to estimates of total Tutuila landings using ASOES and then separated into commercial versus noncommercial landings (e.g., sold versus not sold). The expansion and separation algorithms stratify the data by fishing

method to improve the final estimates of landings by species. After the file of estimated commercial landings for Tutuila was created from the ASOES files, the adjusted commercial landings for Manu'a were added to it, thereby creating the commercial landings data base for American Samoa. Additionally, because price information was not obtained for all landings that were sold, the commercial data were edited to create price information when none was available. To accomplish this, a three-tiered editing system was designed to "create" price estimates based on the best information available. The edit system puts average price information in each record where it is missing, based on the following three levels of available information:

1. If price information is available for the same species in the same month, the weighted average price per pound is written into all records missing that information for that species and month.

2. If no price information is available for the same species and same month, the annual weighted average price for that species is written into records for that species and month.

3. If no price information is available for a species for the entire year, the program prompts the user for input and updates the file based on the response.

As data base records are updated, each is flagged to indicate which level of estimation was used for the price information. This makes it possible to easily exclude the "created" data, if desired, when doing economic analysis.

DATA REPORTING SYSTEM

After all editing, quality control, and other processing activities are completed on the central WPACFIN computer, monthly and annual commercial landings reports by species are generated. Each of the commercial landings reports contains the common name, weight in pounds, value in dollars, and the average price per pound of each species or species group. Each monthly report contains a subtotal for the sum of all species for that month, and the December report contains the December subtotal and the annual total. Annual reports contain the total estimated commercial landings for each species and for all species combined for the calendar year.

Estimated total landings reports are provided separately for Tutuila and Manu'a. Monthly and annual estimated total landings reports are provided for the Manu'a Islands. Two types of total landings reports are included from the creel survey data expansion system, ASOES, for Tutuila: catch and effort expansion reports and species composition reports. These reports were produced by using the expansion and species composition files

created by ASOES as input to utility programs developed by WPACFIN. The utility programs reorganize, format, and summarize data from ASOES files to improve the presentation of data and reduce the amount of space required to report the important statistics. Monthly and annual estimated total landings reports for 1989 include the expansion summary of catch and effort statistics by fishing method and the summary species composition reports for all methods combined.

Monthly expansion and species composition reports have matching totals for catch by fishing method since the monthly species composition reports are based on the expansion files. Annual expansion and species composition reports also have identical totals because the species reports were generated from the annual expansion files. However, the totals on the annual report will not equal the total obtained by adding all of the monthly files together because the annual expansion reports were generated by re-expanding the entire year's data together, thereby increasing the sample size significantly, and it is hoped, improving the annual estimates of percent species composition and of catch and effort and their associated coefficients of variation (CV's). The annual species composition report was created by calculating annual percentages of species composition by combining all sampling for the year and then multiplying these percentages by the annual expansion totals. This allows calculation of annual percent species composition based on greatly increased sample size.

Computer generated numbers and all totals in the reports are subject to rounding error. All catches are reported in pounds, and effort, in boat hours. In the offshore expansion reports, the boat counts by fishing method will not add to the total boat count when the same boat was used for more than one method on a single trip. In these cases, the boat is included in the count for each method used but included only once in the total count. A CV is included for each statistic in the expansion reports. The CV provides a measurement of the relative variation associated with the estimate preceding it and is calculated by dividing the standard error of the estimate by the estimate and multiplying by 100 and rounding to express the answer as a whole percentage. The larger the CV, the larger the relative variation in the data used to generate the estimate and, therefore, the less precise the estimate. An asterisk following a line means the number of samples collected for that method during that month were insufficient to properly calculate the CV. There must be at least two weekday and two weekend-holiday samples for each method to properly compute a standard error and, therefore, properly compute the CV. If an asterisk is present and the CV is greater than zero, then samples on either weekdays or weekend-holidays were sufficient to compute a standard error for that type of day but not for the other type of day. In this case, the CV provided in the report is for the type of day in which sample information met the minimum requirements for calculating CV. If an asterisk is present and the CV equals zero, then neither type of day had

sufficient number of samples to calculate CV. It follows then, anytime an asterisk is present for any of the fishing methods, the totals for the month are questionable.

In fisheries applications, calculation of catch per unit of effort (CPUE) may be done in several ways. In the ASOES expansion reports, average monthly CPUE is calculated by using the same type of algorithm as for the other expansion elements, and it has an associated CV. First, the average daily CPUE is calculated by dividing the total weight of the fish sampled for a day by the total number of hours fished to produce that catch. Next, the average weekday and weekend-holiday CPUE's are calculated by summing the average daily CPUE's for each type of day and then dividing by the number of survey days for each type of day. These averages are multiplied by the number of weekdays and weekend-holidays, respectively, in that month, then the products are summed and divided by the total number of days in the month to produce the average monthly CPUE for each fishing method. The average monthly CPUE could also be calculated by dividing the estimated monthly catch by the estimated monthly boat hours, but this would provide no indication of the variability of the CPUE and also essentially weight the average CPUE by the level of participation. Therefore, the CPUE provided in the monthly and annual expansion reports will not be equal to the catch divided by the effort as presented in those reports.

The following species, species groups, and abbreviations are used in the tables and graphs of American Samoa's data:

I. Pelagic Management Unit Species (PMUS)

Dolphin (mahimahi)
Blue marlin
Black marlin
Sailfish
Shortbill spearfish
Wahoo
Sharks

II. Bottom Fish Management Unit Species (BMUS)

Jacks (unclassified)
Black jack
Amberjack
Giant trevally
Bottom fish (unclassified)
Groupers (unclassified)
Blacktip grouper
Lunartail grouper
Snappers (unclassified)
Bluelined snapper
Gray jobfish (uku)
Deepwater bottom fish (unclassified)
Yellow opakapaka

II. Bottom Fish Management Unit Species (BMUS) (cont.)

Hawaiian opakapaka
Opakapaka
Gindai (flower snapper)
Yellowtail snapper
Lehi (silverjaw snapper)
Onaga (red or longtail snapper)
Ehu (red snapper)
Emperorfish (unclassified)
Ambon emperor
Redgill emperor

III. Billfish

Blue marlin
Black marlin
Sailfish
Shortbill spearfish

IV. Tunas

Tunas (unclassified)
Skipjack tuna
Yellowfin tuna
Dogtooth tuna
Albacore
Bigeye tuna
Kawakawa

V. Other Tuna

The above tuna species excluding skipjack and yellowfin tuna

VI. Fisheries Categories

A. Pelagics

All PMUS and tuna species plus the following:
Troll fish (unclassified)
Barracuda
Rainbow runner

B. Bottom Fish

All BMUS plus the following:
Bigeye trevally
Bluefin trevally
Goldspot trevally
Trevally
Whitemouth trevally
Peacock grouper
Flagtail grouper
Tomato grouper

B. Bottom Fish (cont.)

Yellowspot grouper
Striped grouper
Spotted grouper
Small mouth grouper
Giant grouper
Rufous snapper
Blacktail snapper
Onespot snapper
Twinspot/red snapper
Humpback snapper
Blood snapper
Brown snapper
Bluelined gindai
Black snapper
Stone's snapper
Kusakar's snapper
Bigeye emperor
Goldenline bream
Longnose emperor
Bluelined bream
Orangespot emperor
Snake mackerel
Oilfish

C. Reef Fish

Reef fish (unclassified)
Mullet
Rabbitfish
Surgeonfish and tangs (unclassified)
Lined surgeon
Yelloweyed surgeon
Convict tang
Dussumier's surgeon
Spotted surgeon
Unicornfish
Squirrelfish (unclassified)
Berndt's soldierfish
Bigeye squirrelfish
Parrotfish
Terapon perch
Wrasse
Goatfish (unclassified)
Pink goatfish
Inshore groupers (unclassified)
Triggerfish
Butterflyfish
Porcupinefish
Inshore snappers (unclassified)

D. Other

- Miscellaneous
- Bigeye scad
- Rays
- Eels
- Invertebrates (unclassified)
- Crabs (unclassified)
- Kona crab
- Mangrove crab
- Spiny lobster
- Slipper lobster
- Shrimp
- Octopus
- Squid
- Clams
- Turtle

INTERPRETATION OF STATISTICS

The user is reminded to pay heed to the precautions and assumptions identified earlier in this document, when making interpretations of or inferences from data reported in the tables and graphs. Remember also that neither the commercial landings summaries nor the creel summaries are based on a census of all the fishing activities, but on samples of those activities. One of the major factors in expanding the creel survey data into monthly and annual estimates is the use of proportionality constants to adjust for percent coverage of the surveys. The flexibility of the survey design allows for refinement of these constants as additional information is gained on the fishing activities. If the constants are improved upon, the basic survey data can be re-expanded to create better overall estimates. However, the variability and species composition would not be expected to change since these statistics are strictly based on the actual survey information collected from the fishermen. The estimates of total landings are considered to be conservative because the inshore fisheries are currently not included in DMWR's sampling programs. However, WPACFIN has developed the basic design for inshore sampling and data expansion systems, and DMWR plans to implement them when resources become available.

Table II.1.1

American Samoa 1989 Annual Estimated Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	442	553	1.25
Jacks	1,838	2,472	1.34
Black jack	754	1,199	1.59
Trevally	454	681	1.50
Barracudas	843	1,186	1.41
Large barracuda	262	356	1.36
Small barracuda	1,090	1,752	1.61
Sharks	951	919	0.97
Eels	55	82	1.49
Groupers	2,264	3,392	1.50
Peacock grouper	903	1,424	1.58
Flagtail grouper	87	131	1.51
Tomato grouper	577	814	1.41
Blacktip grouper	62	93	1.50
Yellowspot grouper	87	131	1.51
Spotted grouper	918	1,413	1.54
Smalltooth grouper	30	45	1.50
Giant grouper	401	598	1.49
Lunartail grouper	2,669	4,256	1.59
Blue lined snapper	5,879	9,031	1.54
Rufous snapper	453	679	1.50
Onespot snapper	200	282	1.41
Twinspot/red snapper	39	54	1.38
Humpback snapper	2,339	3,507	1.50
Brown jobfish	29	51	1.70
Gray jobfish	1,958	3,263	1.67
Deepwater bottomfish	447	572	1.28
Hawaiian opakapaka	249	367	1.48
Opakapaka	264	426	1.61
Gindai (flower snap)	594	860	1.45
Lehi (silverjaw)	1,219	2,003	1.64
Onaga (red snapper)	1,708	2,827	1.65
Ehu (red snapper)	1,366	2,171	1.59
Bigeye emperor	27	42	1.56
Emperors (misc)	1,436	2,263	1.58
Longnose emperor	1,200	1,710	1.43
Ambon emperor	1,102	1,666	1.51
Blueline bream	54	86	1.59
Orangespot emperor	60	99	1.65
Redgill emperor	3,817	6,022	1.58
Rudderfish	90	135	1.50
Lined surgeon	10,540	15,666	1.49
Yellow eyed surgeon	5,776	8,581	1.49
Dussumier's surgeon	748	1,122	1.50
Spotted surgeonfish	396	577	1.46
Unicornfish (misc)	4,372	6,627	1.52

Table [illegible]

Species	Pounds	Value	$/lb
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

Table II.1.2

American Samoa January 1989 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	93	117	1.25
Peacock grouper	141	224	1.59
Spotted grouper	162	243	1.50
Lunartail grouper	281	460	1.64
Blue lined snapper	120	150	1.25
Humpback snapper	211	324	1.54
Deepwater bottomfish	60	75	1.25
Opakapaka	40	50	1.25
Ehu (red snapper)	160	200	1.25
Ambon emperor	209	328	1.57
Lined surgeon	928	1,401	1.51
Yellow eyed surgeon	520	785	1.51
Dussumier's surgeon	87	131	1.51
Spotted surgeonfish	42	63	1.50
Unicornfish (misc)	317	478	1.51
Squirrelfish	507	760	1.50
Parrotfish	666	999	1.50
Wrasse	211	316	1.50
Skipjack tuna	11,836	6,271	0.53
Yellowfin tuna	1,973	3,314	1.68
Kawakawa	14	11	0.79
Spiny lobster	484	972	2.01
** SUBTOTAL **	19,062	17,672	

Table II.1.3

American Samoa February 1989 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Black jack	316	511	1.62
Small barracuda	234	374	1.60
Groupers	509	727	1.43
Peacock grouper	313	469	1.50
Tomato grouper	163	244	1.49
Spotted grouper	103	165	1.60
Lunartail grouper	475	764	1.61
Blue lined snapper	363	585	1.61
Onespot snapper	33	42	1.25
Humpback snapper	138	194	1.41
Brown jobfish	29	51	1.76
Gray jobfish	43	71	1.65
Gindai (flower snap)	67	83	1.25
Lehi (silverjaw)	58	95	1.64
Emperors (misc)	564	936	1.66
Ambon emperor	75	120	1.60
Blueline bream	54	86	1.59
Rudderfish	90	135	1.50
Lined surgeon	1,524	2,240	1.47
Yellow eyed surgeon	686	987	1.44
Spotted surgeonfish	29	40	1.38
Unicornfish (misc)	1,046	1,610	1.54
Unicornfish	174	245	1.41
Squirrelfish	784	1,183	1.51
Bigeye squirrelfish	194	291	1.50
Parrotfish	1,657	2,452	1.48
Triggerfish	29	48	1.66
Porcupinefish	56	89	1.59
Dolphin (mahimahi)	32	40	1.25
Blue marlin	1,647	1,647	1.00
Rainbow runner	115	159	1.38
Wahoo	146	146	1.00
Skipjack tuna	8,791	5,610	0.64
Dogtooth tuna	54	54	1.00
Yellowfin tuna	2,462	4,252	1.73
Kawakawa	108	98	0.91
Spiny lobster	791	1,589	2.01
Slipper lobster	327	588	1.80
Squid	90	135	1.50
** SUBTOTAL **	24,368	29,156	

Table II.1.4

American Samoa March 1989 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	60	75	1.25
Black jack	30	48	1.60
Groupers	615	891	1.45
Peacock grouper	59	94	1.59
Tomato grouper	40	50	1.25
Onespot snapper	40	50	1.25
Humpback snapper	27	33	1.25
Deepwater bottomfish	73	92	1.25
Onaga (red snapper)	221	353	1.60
Ehu (red snapper)	197	315	1.60
Emperors (misc)	53	67	1.25
Lined surgeon	1,914	2,775	1.45
Yellow eyed surgeon	1,053	1,537	1.46
Spotted surgeonfish	149	210	1.41
Unicornfish	622	908	1.46
Squirrelfish	443	655	1.48
Parrotfish	1,240	1,798	1.45
Dolphin (mahimahi)	101	203	2.01
Rainbow runner	53	53	1.00
Wahoo	335	335	1.00
Skipjack tuna	2,063	1,706	0.83
Dogtooth tuna	93	93	1.00
Yellowfin tuna	1,051	1,011	0.96
Spiny lobster	748	1,600	2.14
** SUBTOTAL **	11,281	14,952	

Table II.1.5

American Samoa April 1989 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	67	83	1.25
Small barracuda	72	102	1.42
Groupers	114	159	1.39
Tomato grouper	47	58	1.25
Lunartail grouper	189	295	1.56
Blue lined snapper	252	391	1.55
Gray jobfish	160	264	1.65
Deepwater bottomfish	80	100	1.25
Hawaiian opakapaka	87	108	1.25
Onaga (red snapper)	311	562	1.81
Ehu (red snapper)	195	390	2.00
Emperors (misc)	67	83	1.25
Ambon emperor	231	381	1.65
Lined surgeon	220	316	1.44
Yellow eyed surgeon	89	125	1.40
Unicornfish (misc)	124	174	1.40
Unicornfish	135	203	1.50
Squirrelfish	128	180	1.41
Saber squirrelfish	124	205	1.65
Parrotfish	456	661	1.45
Dolphin (mahimahi)	8	10	1.25
Blue marlin	1,679	1,679	1.00
Rainbow runner	5	5	1.00
Wahoo	65	65	1.00
Skipjack tuna	5,787	5,017	0.87
Dogtooth tuna	36	36	1.00
Yellowfin tuna	1,990	2,667	1.34
Kawakawa	40	40	1.00
Spiny lobster	32	64	2.00
** SUBTOTAL **	12,789	14,425	

Table II.1.6

American Samoa May 1989 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Barracudas	37	37	1.00
Small barracuda	185	307	1.66
Groupers	38	62	1.63
Tomato grouper	81	134	1.65
Lunartail grouper	148	245	1.66
Blue lined snapper	590	946	1.60
Humpback snapper	142	235	1.65
Gray jobfish	212	349	1.65
Gindai (flower snap)	53	67	1.25
Lehi (silverjaw)	46	76	1.65
Bigeye emperor	15	24	1.60
Emperors (misc)	189	276	1.46
Ambon emperor	250	412	1.65
Orangespot emperor	60	99	1.65
Redgill emperor	724	1,201	1.66
Lined surgeon	513	759	1.48
Yellow eyed surgeon	312	458	1.47
Unicornfish (misc)	96	135	1.41
Unicornfish	308	492	1.60
Squirrelfish	115	172	1.50
Saber squirrelfish	135	222	1.64
Parrotfish	574	855	1.49
Triggerfish	23	38	1.65
Dolphin (mahimahi)	158	292	1.85
Blue marlin	462	462	1.00
Wahoo	60	60	1.00
Skipjack tuna	15,079	10,712	0.71
Dogtooth tuna	61	61	1.00
Yellowfin tuna	8,671	11,810	1.36
Kawakawa	31	20	0.65
Spiny lobster	115	231	2.01
Octopus	62	77	1.24
** SUBTOTAL **	29,546	31,327	

Table II.1.7

American Samoa June 1989 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	239	221	0.92
Trevally	454	681	1.50
Barracudas	142	107	0.75
Small barracuda	24	36	1.50
Eels	22	33	1.50
Groupers	257	385	1.50
Spotted grouper	653	1,005	1.54
Giant grouper	385	577	1.50
Lunartail grouper	67	100	1.50
Blue lined snapper	93	140	1.50
Humpback snapper	478	736	1.54
Gray jobfish	53	80	1.50
Deepwater bottomfish	53	80	1.50
Gindai (flower snap)	195	292	1.50
Lehi (silverjaw)	255	418	1.64
Onaga (red snapper)	737	1,293	1.75
Ambon emperor	80	120	1.50
Lined surgeon	1,378	2,039	1.48
Yellow eyed surgeon	890	1,326	1.49
Dussumier's surgeon	661	991	1.50
Unicornfish (misc)	2,171	3,299	1.52
Squirrelfish	91	137	1.51
Saber squirrelfish	563	928	1.65
Parrotfish	2,387	3,556	1.49
Porcupinefish	61	97	1.59
Dolphin (mahimahi)	495	994	2.01
Blue marlin	203	205	1.01
Rainbow runner	92	92	1.00
Skipjack tuna	2,853	2,533	0.89
Dogtooth tuna	649	1,057	1.63
Yellowfin tuna	4,838	7,733	1.60
Spiny lobster	1,135	2,360	2.08
Octopus	397	496	1.25
** SUBTOTAL **	23,052	34,147	

Table II.1.8

American Samoa July 1989 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	347	358	1.03
Barracudas	151	199	1.32
Small barracuda	31	46	1.48
Groupers	103	155	1.50
Tomato grouper	80	100	1.25
Lunartail grouper	161	246	1.52
Blue lined snapper	686	838	1.22
Onespot snapper	40	50	1.25
Twinspot/red snapper	31	46	1.48
Humpback snapper	255	242	0.95
Gray jobfish	39	65	1.67
Deepwater bottomfish	60	75	1.25
Bigeye emperor	12	18	1.50
Emperors (misc)	344	567	1.65
Longnose emperor	317	240	0.76
Ambon emperor	116	88	0.76
Redgill emperor	422	476	1.13
Lined surgeon	2,252	3,400	1.51
Yellow eyed surgeon	1,149	1,734	1.51
Spotted surgeonfish	132	198	1.50
Unicornfish (misc)	395	596	1.51
Unicornfish	577	871	1.51
Squirrelfish	391	297	0.76
Parrotfish	1,455	2,197	1.51
Inshore groupers	31	46	1.48
Blue marlin	333	333	1.00
Rainbow runner	19	14	0.74
Wahoo	217	219	1.01
Skipjack tuna	2,980	2,264	0.76
Dogtooth tuna	310	505	1.63
Yellowfin tuna	2,043	3,084	1.51
Kawakawa	31	26	0.84
Crabs	19	38	2.00
Spiny lobster	936	2,134	2.28
Octopus	170	212	1.25
** SUBTOTAL **	16,635	21,977	

Table II.1.9

American Samoa August 1989 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	424	682	1.61
Black jack	35	56	1.60
Barracudas	293	501	1.71
Small barracuda	113	184	1.63
Groupers	102	174	1.71
Peacock grouper	139	221	1.59
Flagtail grouper	87	131	1.51
Tomato grouper	54	88	1.63
Blacktip grouper	62	93	1.50
Yellowspot grouper	87	131	1.51
Smalltooth grouper	30	45	1.50
Lunartail grouper	273	439	1.61
Blue lined snapper	1,402	2,327	1.66
Rufous snapper	453	679	1.50
Onespot snapper	87	140	1.61
Humpback snapper	380	611	1.61
Gray jobfish	891	1,532	1.72
Opakapaka	164	301	1.84
Gindai (flower snap)	279	418	1.50
Onaga (red snapper)	194	312	1.61
Ehu (red snapper)	238	442	1.86
Longnose emperor	332	567	1.71
Ambon emperor	62	99	1.60
Redgill emperor	736	1,184	1.61
Lined surgeon	278	419	1.51
Yellow eyed surgeon	104	157	1.51
Unicornfish (misc)	69	104	1.51
Squirrelfish	187	280	1.50
Saber squirrelfish	17	27	1.59
Parrotfish	160	240	1.50
Pink goatfish	35	52	1.49
Dolphin (mahimahi)	490	984	2.01
Rainbow runner	171	254	1.49
Skipjack tuna	2,228	2,162	0.97
Dogtooth tuna	87	174	2.00
Yellowfin tuna	2,393	4,662	1.95
Spiny lobster	87	218	2.51
Octopus	125	157	1.26
** SUBTOTAL **	13,348	21,247	

Table II.1.10

American Samoa September 1989 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	119	189	1.58
Black jack	90	151	1.68
Small barracuda	319	523	1.64
Sharks	199	200	1.01
Groupers	71	117	1.65
Lunartail grouper	83	141	1.70
Blue lined snapper	422	696	1.65
Humpback snapper	40	60	1.50
Gray jobfish	146	245	1.68
Lehi (silverjaw)	60	99	1.65
Ehu (red snapper)	50	100	2.00
Emperors (misc)	47	79	1.68
Ambon emperor	53	80	1.50
Redgill emperor	302	501	1.66
Lined surgeon	581	859	1.48
Yellow eyed surgeon	415	614	1.48
Unicornfish	279	421	1.51
Squirrelfish	322	518	1.61
Parrotfish	282	417	1.48
Dolphin (mahimahi)	163	327	2.01
Tunas	60	60	1.00
Skipjack tuna	1,187	1,119	0.94
Yellowfin tuna	581	586	1.01
Crabs	116	232	2.00
Spiny lobster	136	282	2.07
** SUBTOTAL **	6,124	8,616	

Table II.1.11

American Samoa October 1989 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	47	58	1.25
Jacks	145	199	1.38
Black jack	12	16	1.37
Large barracuda	222	299	1.35
Sharks	422	389	0.92
Eels	33	49	1.48
Groupers	198	306	1.54
Tomato grouper	71	88	1.25
Lunartail grouper	131	181	1.38
Blue lined snapper	287	394	1.37
Twinspot/red snapper	8	8	1.00
Humpback snapper	218	334	1.53
Deepwater bottomfish	120	150	1.25
Lehi (silverjaw)	450	742	1.65
Onaga (red snapper)	55	68	1.25
Ehu (red snapper)	179	291	1.63
Emperors (misc)	53	67	1.25
Redgill emperor	173	285	1.65
Lined surgeon	294	441	1.50
Yellow eyed surgeon	220	330	1.50
Squirrelfish	302	423	1.40
Saber squirrelfish	9	13	1.37
Parrotfish	334	501	1.50
Dolphin (mahimahi)	133	252	1.90
Rainbow runner	71	117	1.65
Wahoo	182	183	1.01
Tunas	52	52	1.00
Skipjack tuna	14,395	12,778	0.89
Dogtooth tuna	113	152	1.35
Yellowfin tuna	4,230	5,625	1.33
Spiny lobster	132	219	1.66
** SUBTOTAL **	23,290	25,011	

Table II.1.12

American Samoa November 1989 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	288	360	1.25
Jacks	343	548	1.60
Black jack	192	294	1.54
Barracudas	220	342	1.56
Large barracuda	40	57	1.42
Small barracuda	65	105	1.62
Sharks	330	330	1.00
Groupers	257	416	1.62
Peacock grouper	251	416	1.66
Tomato grouper	16	20	1.25
Giant grouper	16	21	1.33
Lunartail grouper	840	1,357	1.62
Blue lined snapper	1,455	2,256	1.55
Humpback snapper	416	682	1.64
Gray jobfish	397	631	1.59
Hawaiian opakapaka	162	259	1.60
Opakapaka	60	75	1.25
Lehi (silverjaw)	245	404	1.65
Onaga (red snapper)	176	220	1.25
Ehu (red snapper)	299	373	1.25
Emperors (misc)	118	189	1.60
Longnose emperor	551	903	1.64
Ambon emperor	25	38	1.50
Redgill emperor	1,303	2,123	1.63
Lined surgeon	338	537	1.59
Yellow eyed surgeon	195	313	1.61
Unicornfish (misc)	96	144	1.50
Unicornfish	62	102	1.65
Squirrelfish	398	562	1.41
Saber squirrelfish	35	48	1.37
Parrotfish	236	379	1.61
Triggerfish	12	19	1.58
Dolphin (mahimahi)	134	229	1.72
Wahoo	76	76	1.00
Skipjack tuna	9,667	8,904	0.92
Dogtooth tuna	55	55	1.00
Yellowfin tuna	2,969	3,991	1.34
Kawakawa	65	55	0.85
** SUBTOTAL **	22,400	27,833	

Table II.1.13

American Samoa December 1989 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	107	134	1.25
Black jack	79	122	1.54
Small barracuda	47	75	1.60
Tomato grouper	25	32	1.25
Lunartail grouper	21	28	1.33
Blue lined snapper	209	307	1.47
Humpback snapper	35	56	1.60
Gray jobfish	17	26	1.50
Lehi (silverjaw)	105	169	1.61
Onaga (red snapper)	15	19	1.29
Ehu (red snapper)	48	60	1.25
Redgill emperor	157	252	1.61
Lined surgeon	320	480	1.50
Yellow eyed surgeon	143	215	1.50
Spotted surgeonfish	44	66	1.50
Unicornfish (misc)	58	87	1.50
Unicornfish	61	91	1.49
Squirrelfish	82	110	1.35
Saber squirrelfish	15	20	1.37
Parrotfish	147	220	1.50
Dolphin (mahimahi)	113	214	1.89
Wahoo	12	12	1.00
Skipjack tuna	1,886	1,633	0.87
Dogtooth tuna	27	27	1.00
Yellowfin tuna	1,674	1,795	1.07
Spiny lobster	256	512	2.00
** SUBTOTAL **	5,704	6,762	
** TOTAL **	207,599	253,123	

Table II.2.1

American Samoa 1989 Annual Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	442	553	1.25
Jacks	504	657	1.30
Black jack	92	126	1.37
Barracudas	87	123	1.42
Large barracuda	167	237	1.42
Small barracuda	72	102	1.42
Sharks	133	100	0.75
Groupers	80	100	1.25
Tomato grouper	332	415	1.25
Giant grouper	16	21	1.33
Lunartail grouper	333	440	1.32
Blue lined snapper	1,146	1,475	1.29
Onespot snapper	113	142	1.25
Twinspot/red snapper	8	8	1.00
Humpback snapper	101	142	1.40
Gray jobfish	137	206	1.50
Deepwater bottomfish	447	572	1.28
Hawaiian opakapaka	87	108	1.25
Opakapaka	100	125	1.25
Gindai (flower snap)	120	150	1.25
Onaga (red snapper)	365	467	1.28
Ehu (red snapper)	575	718	1.25
Emperors (misc)	267	333	1.25
Ambon emperor	159	238	1.50
Squirrelfish	376	470	1.25
Saber squirrelfish	59	80	1.37
Dolphin (mahimahi)	157	197	1.25
Rainbow runner	264	264	1.00
Wahoo	252	252	1.00
Skipjack tuna	7,549	7,549	1.00
Dogtooth tuna	323	323	1.00
Yellowfin tuna	8,477	9,453	1.12
Kawakawa	40	40	1.00
** TOTAL **	23,380	26,185	

Table II.2.2

American Samoa January 1989 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	93	117	1.25
Blue lined snapper	120	150	1.25
Deepwater bottomfish	60	75	1.25
Opakapaka	40	50	1.25
Ehu (red snapper)	160	200	1.25
Skipjack tuna	480	480	1.00
Yellowfin tuna	376	376	1.00
** SUBTOTAL **	1,329	1,448	

Table II.2.3

American Samoa February 1989 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Groupers	27	33	1.25
Tomato grouper	53	67	1.25
Blue lined snapper	47	58	1.25
Onespot snapper	33	42	1.25
Gindai (flower snap)	67	83	1.25
Dolphin (mahimahi)	32	40	1.25
Rainbow runner	47	47	1.00
Wahoo	45	45	1.00
Skipjack tuna	840	840	1.00
Yellowfin tuna	843	1,095	1.30
** SUBTOTAL **	2,033	2,351	

Table II.2.4

American Samoa March 1989 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	60	75	1.25
Tomato grouper	40	50	1.25
Onespot snapper	40	50	1.25
Humpback snapper	27	33	1.25
Deepwater bottomfish	73	92	1.25
Emperors (misc)	53	67	1.25
Rainbow runner	53	53	1.00
Skipjack tuna	80	80	1.00
Dogtooth tuna	93	93	1.00
Yellowfin tuna	67	67	1.00
** SUBTOTAL **	587	660	

Table II.2.5

American Samoa April 1989 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	67	83	1.25
Small barracuda	72	102	1.42
Tomato grouper	47	58	1.25
Lunartail grouper	40	50	1.25
Blue lined snapper	60	75	1.25
Deepwater bottomfish	80	100	1.25
Hawaiian opakapaka	87	108	1.25
Onaga (red snapper)	80	100	1.25
Emperors (misc)	67	83	1.25
Dolphin (mahimahi)	8	10	1.25
Rainbow runner	5	5	1.00
Wahoo	65	65	1.00
Skipjack tuna	655	655	1.00
Dogtooth tuna	36	36	1.00
Yellowfin tuna	879	879	1.00
Kawakawa	40	40	1.00
** SUBTOTAL **	2,287	2,451	

Table II.2.6

American Samoa May 1989 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Blue lined snapper	80	100	1.25
Gindai (flower snap)	53	67	1.25
Emperors (misc)	93	117	1.25
Dolphin (mahimahi)	31	38	1.25
Wahoo	60	60	1.00
Skipjack tuna	993	993	1.00
Dogtooth tuna	61	61	1.00
Yellowfin tuna	1,316	1,513	1.15
** SUBTOTAL **	2,688	2,950	

Table II.2.7

American Samoa June 1989 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	53	80	1.50
Lunartail grouper	67	100	1.50
Blue lined snapper	93	140	1.50
Gray jobfish	53	80	1.50
Deepwater bottomfish	53	80	1.50
Onaga (red snapper)	40	60	1.50
Ambon emperor	80	120	1.50
Rainbow runner	92	92	1.00
Skipjack tuna	393	393	1.00
Yellowfin tuna	120	138	1.15
** SUBTOTAL **	1,045	1,283	

Table II.2.8

American Samoa July 1989 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	53	67	1.25
Tomato grouper	80	100	1.25
Lunartail grouper	53	67	1.25
Blue lined snapper	67	83	1.25
Onespot snapper	40	50	1.25
Deepwater bottomfish	60	75	1.25
** SUBTOTAL **	353	442	

Table II.2.9

American Samoa August 1989 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Rainbow runner	67	67	1.00
Skipjack tuna	53	53	1.00
Yellowfin tuna	53	53	1.00
** SUBTOTAL **	173	173	

Table II.2.10

American Samoa September 1989 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	53	80	1.50
Blue lined snapper	53	80	1.50
Humpback snapper	40	60	1.50
Ambon emperor	53	80	1.50
Skipjack tuna	67	67	1.00
** SUBTOTAL **	267	367	

Table II.2.11

American Samoa October 1989 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	47	58	1.25
Jacks	71	88	1.25
Black jack	12	16	1.37
Large barracuda	127	180	1.42
Sharks	133	100	0.75
Groupers	53	67	1.25
Tomato grouper	71	88	1.25
Lunartail grouper	89	112	1.25
Blue lined snapper	200	250	1.25
Twinspot/red snapper	8	8	1.00
Humpback snapper	35	49	1.40
Deepwater bottomfish	120	150	1.25
Onaga (red snapper)	55	68	1.25
Ehu (red snapper)	68	85	1.25
Emperors (misc)	53	67	1.25
Squirrelfish	115	143	1.25
Saber squirrelfish	9	13	1.37
Dolphin (mahimahi)	19	23	1.25
Wahoo	37	37	1.00
Skipjack tuna	1,960	1,960	1.00
Dogtooth tuna	51	51	1.00
Yellowfin tuna	2,575	2,961	1.15
** SUBTOTAL **	5,907	6,575	

Table II.2.12

American Samoa November 1989 Manu'a
Estimated Commercial Landings

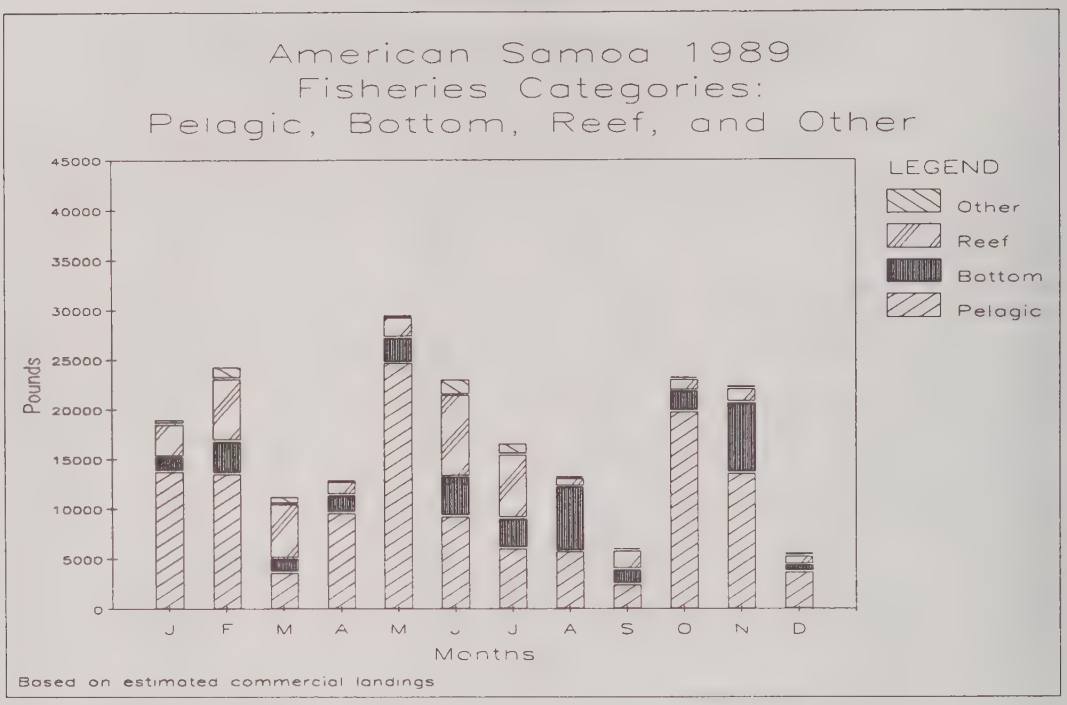
Species	Pounds	Value	$/lb
Miscellaneous	288	360	1.25
Jacks	53	67	1.25
Black jack	59	80	1.37
Barracudas	87	123	1.42
Large barracuda	40	57	1.42
Tomato grouper	16	20	1.25
Giant grouper	16	21	1.33
Lunartail grouper	63	83	1.33
Blue lined snapper	333	416	1.25
Gray jobfish	67	100	1.50
Opakapaka	60	75	1.25
Onaga (red snapper)	176	220	1.25
Ehu (red snapper)	299	373	1.25
Ambon emperor	25	38	1.50
Squirrelfish	215	268	1.25
Saber squirrelfish	35	48	1.37
Dolphin (mahimahi)	51	63	1.25
Wahoo	32	32	1.00
Skipjack tuna	1,195	1,195	1.00
Dogtooth tuna	55	55	1.00
Yellowfin tuna	1,443	1,443	1.00
** SUBTOTAL **	4,605	5,137	

Table II.2.13

American Samoa December 1989 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	107	134	1.25
Black jack	21	29	1.37
Tomato grouper	25	32	1.25
Lunartail grouper	21	28	1.33
Blue lined snapper	93	122	1.31
Gray jobfish	17	26	1.50
Onaga (red snapper)	15	19	1.29
Ehu (red snapper)	48	60	1.25
Squirrelfish	47	58	1.25
Saber squirrelfish	15	20	1.37
Dolphin (mahimahi)	17	22	1.25
Wahoo	12	12	1.00
Skipjack tuna	833	833	1.00
Dogtooth tuna	27	27	1.00
Yellowfin tuna	807	928	1.15
** SUBTOTAL **	2,106	2,350	
** TOTAL **	23,380	26,185	

Figure II.1.1



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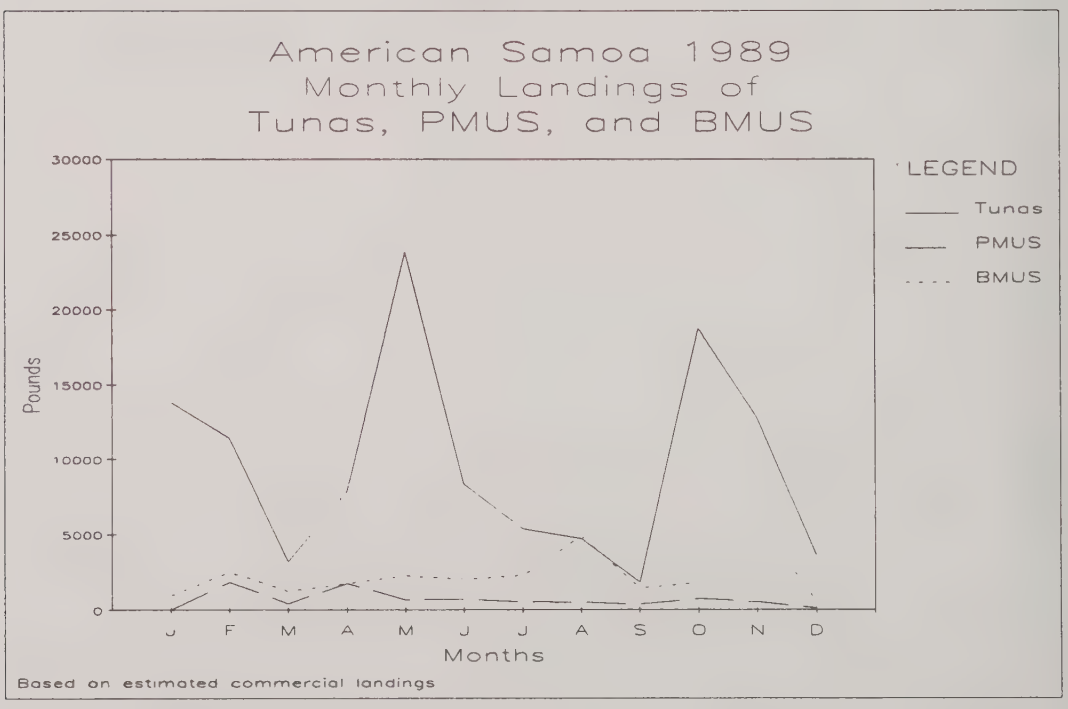

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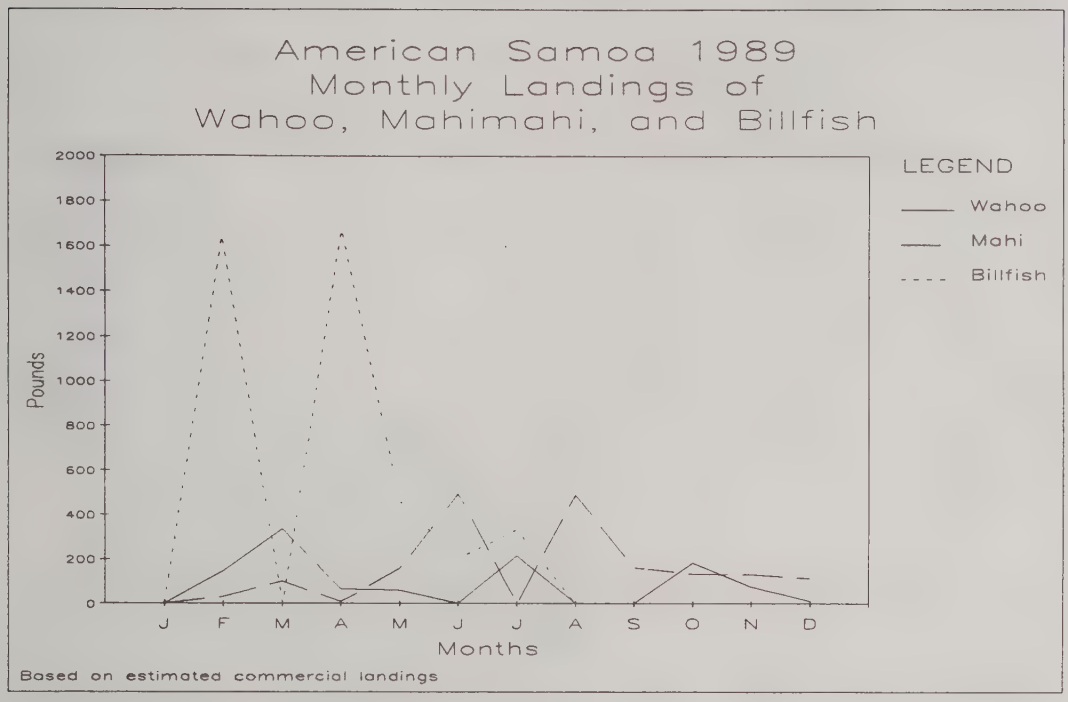

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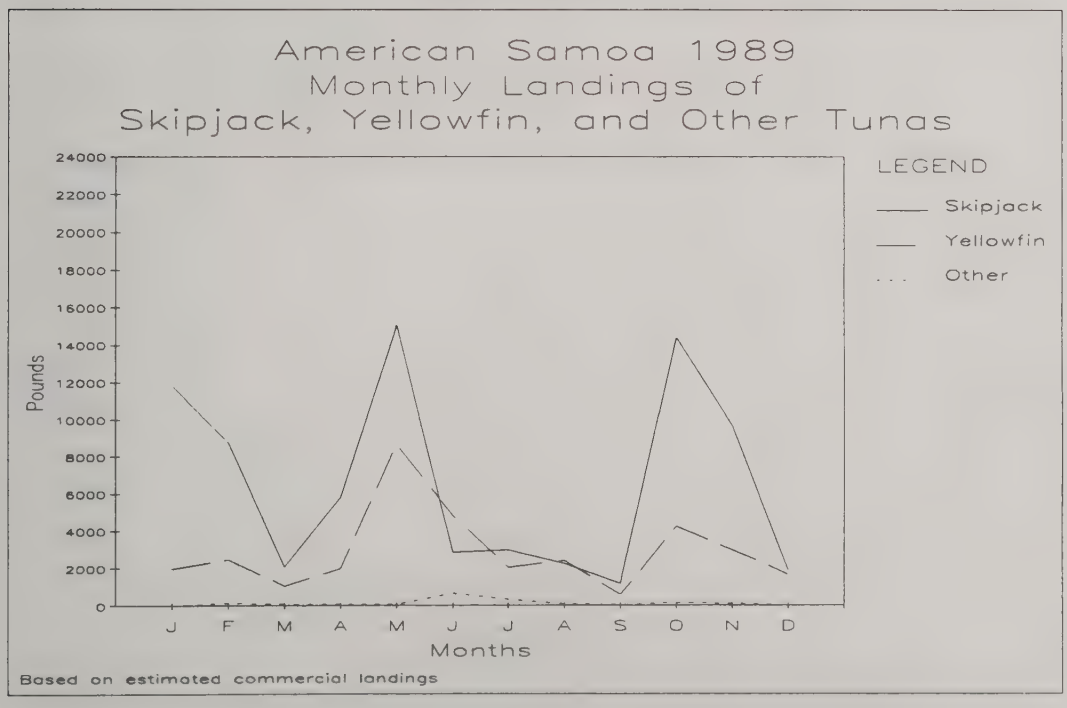

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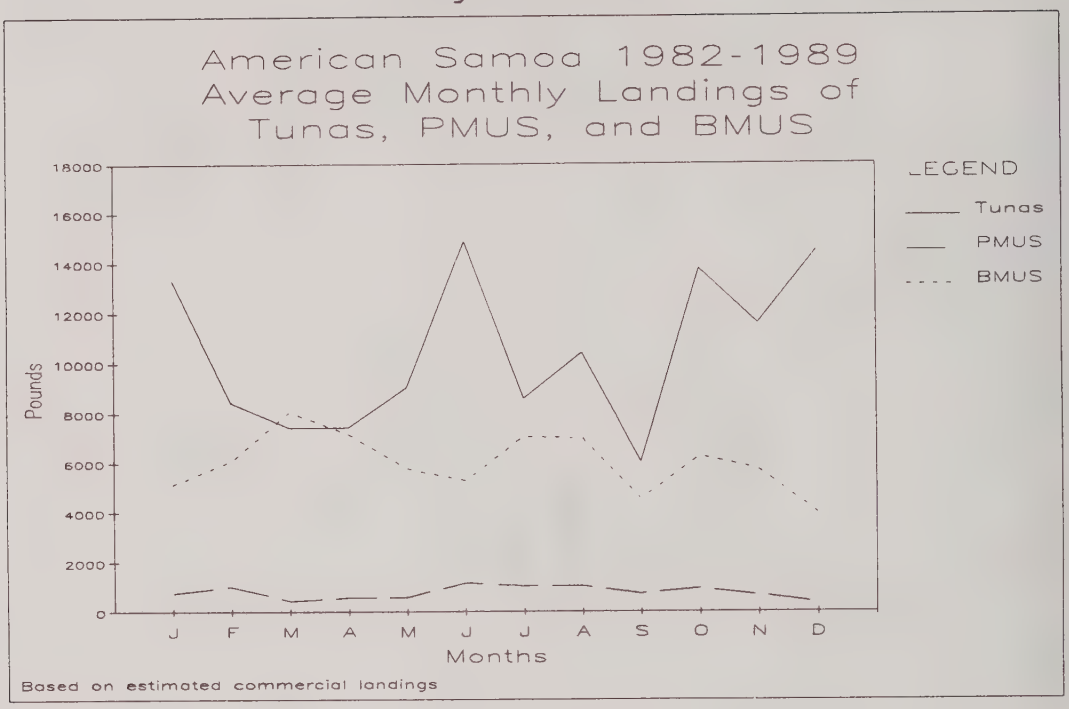

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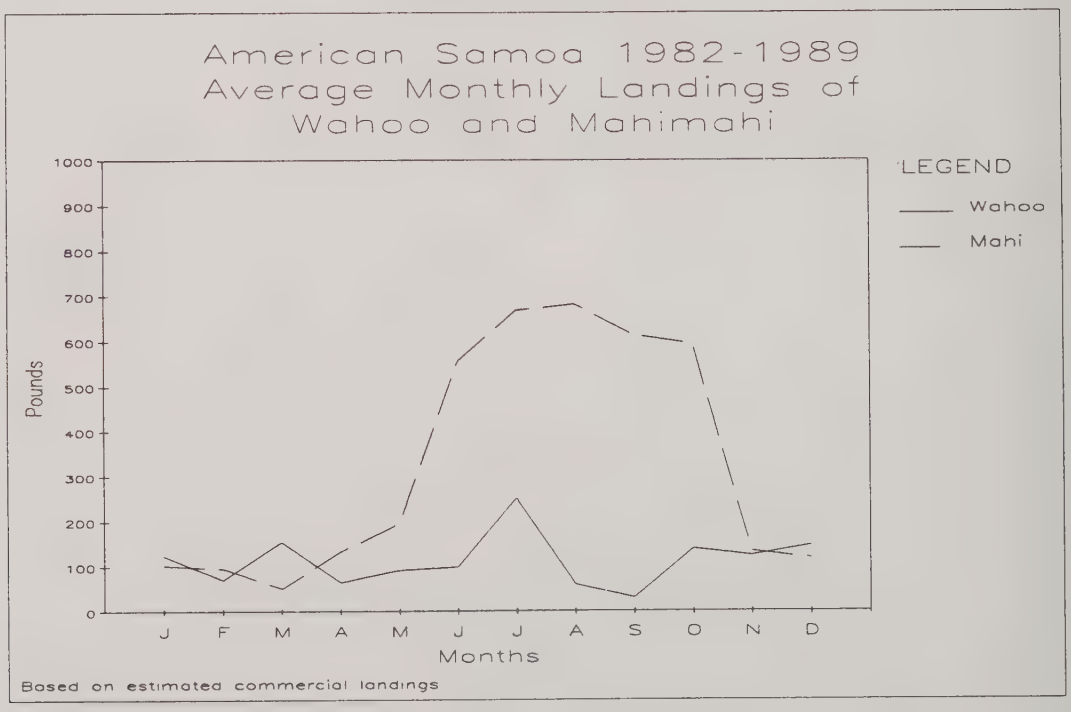

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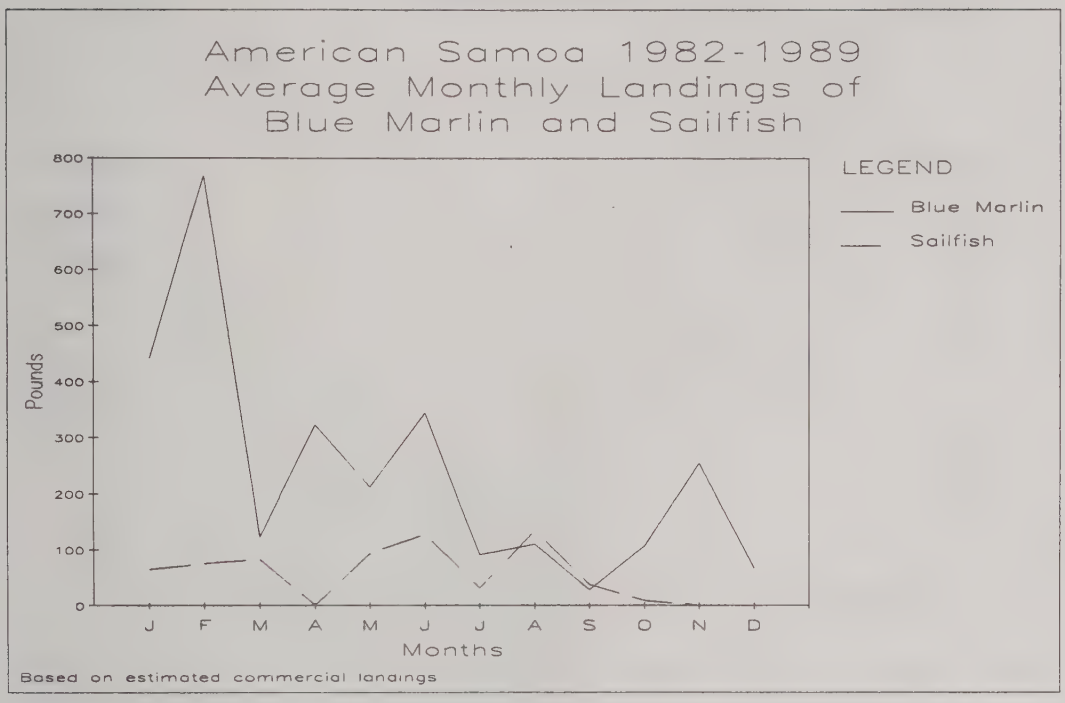

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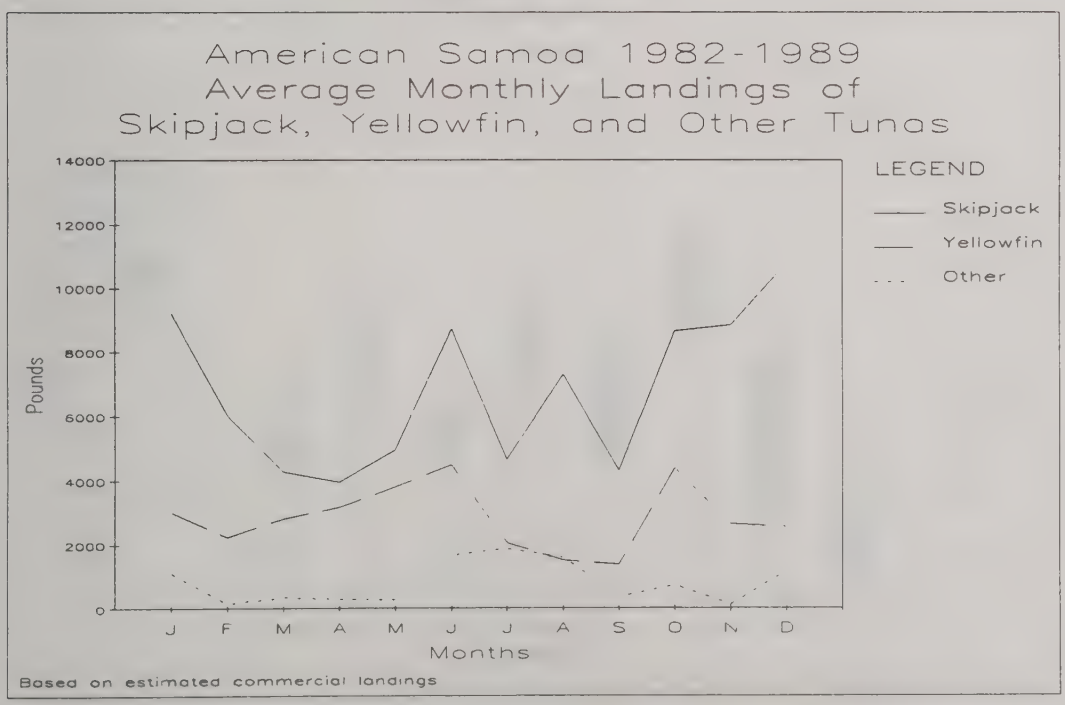

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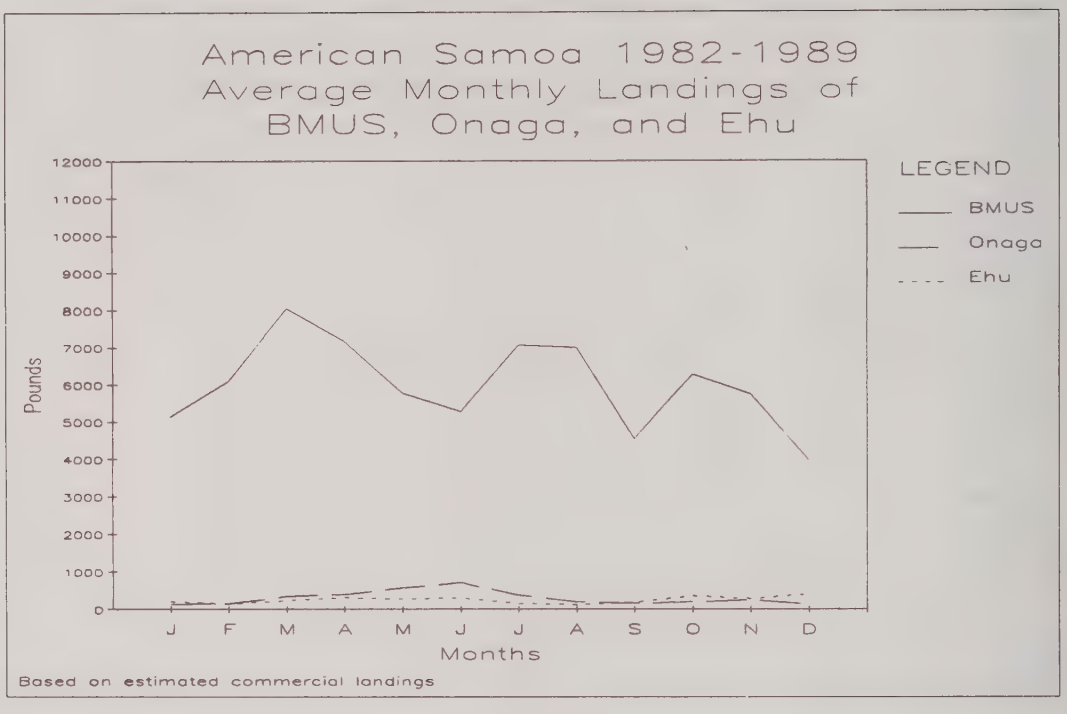

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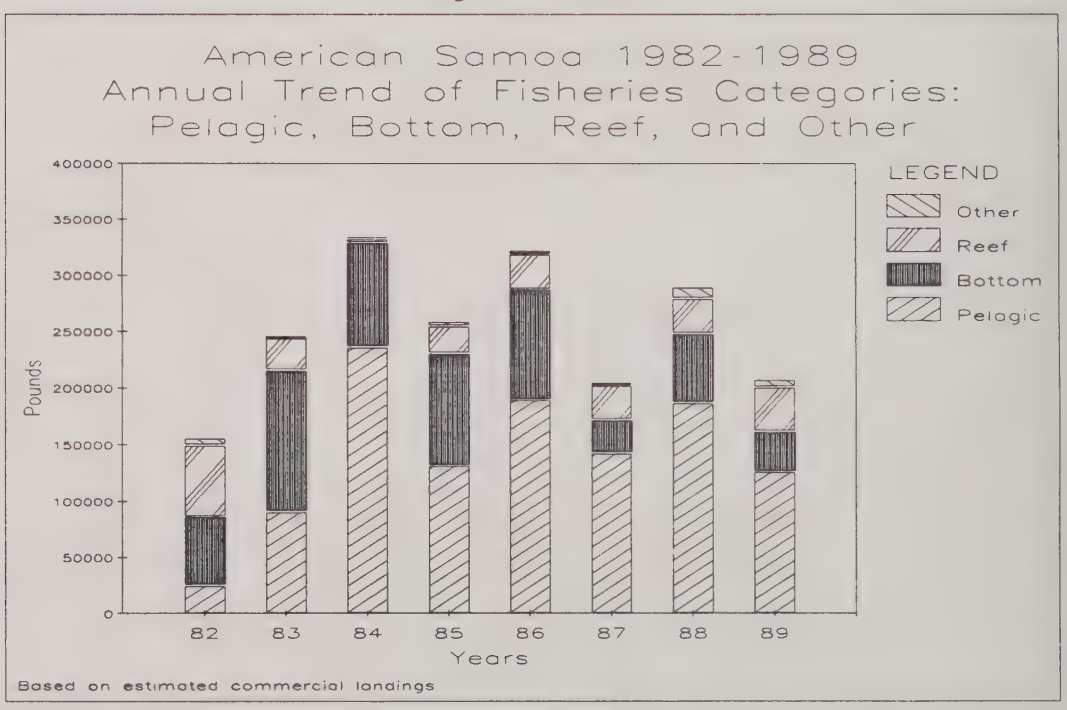

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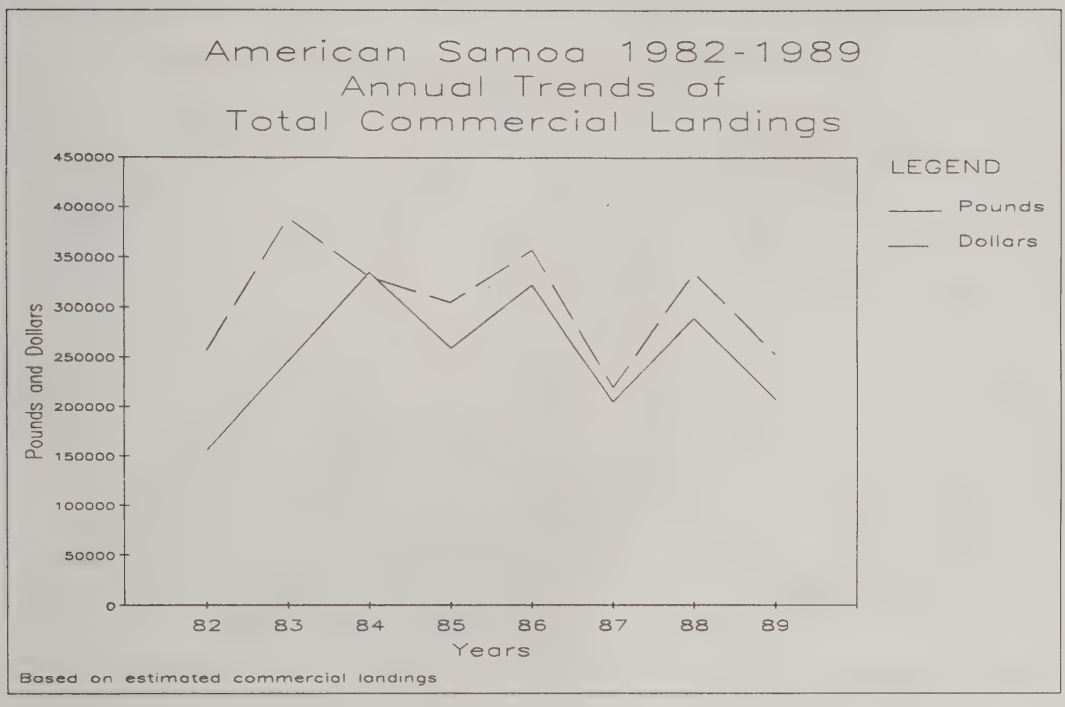

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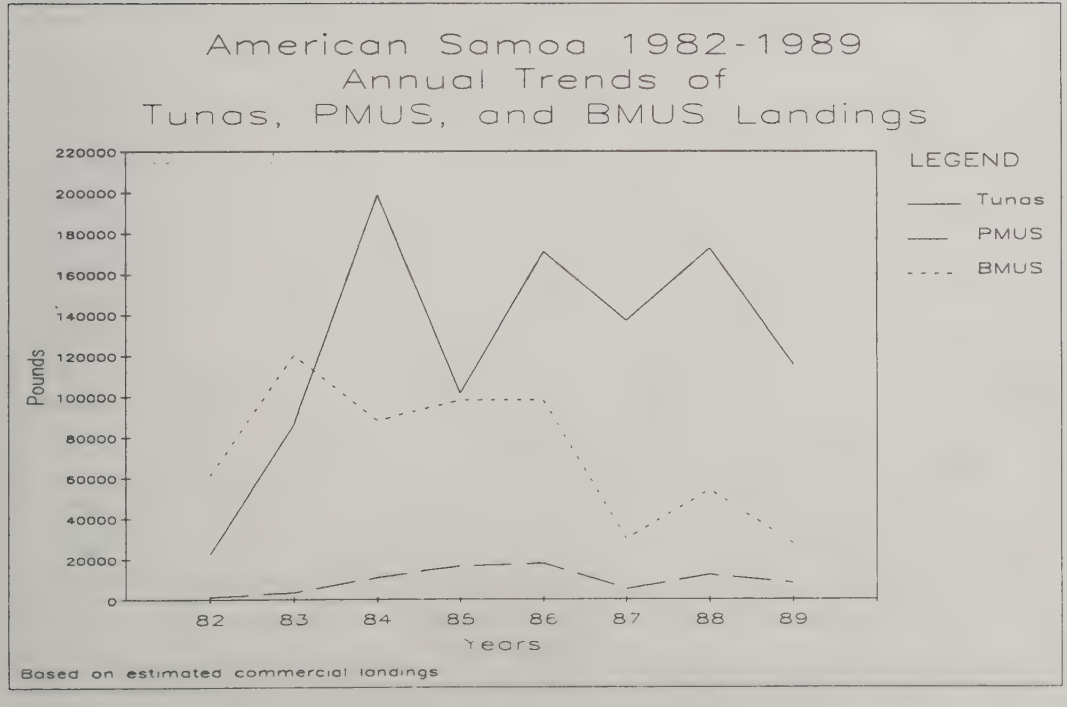

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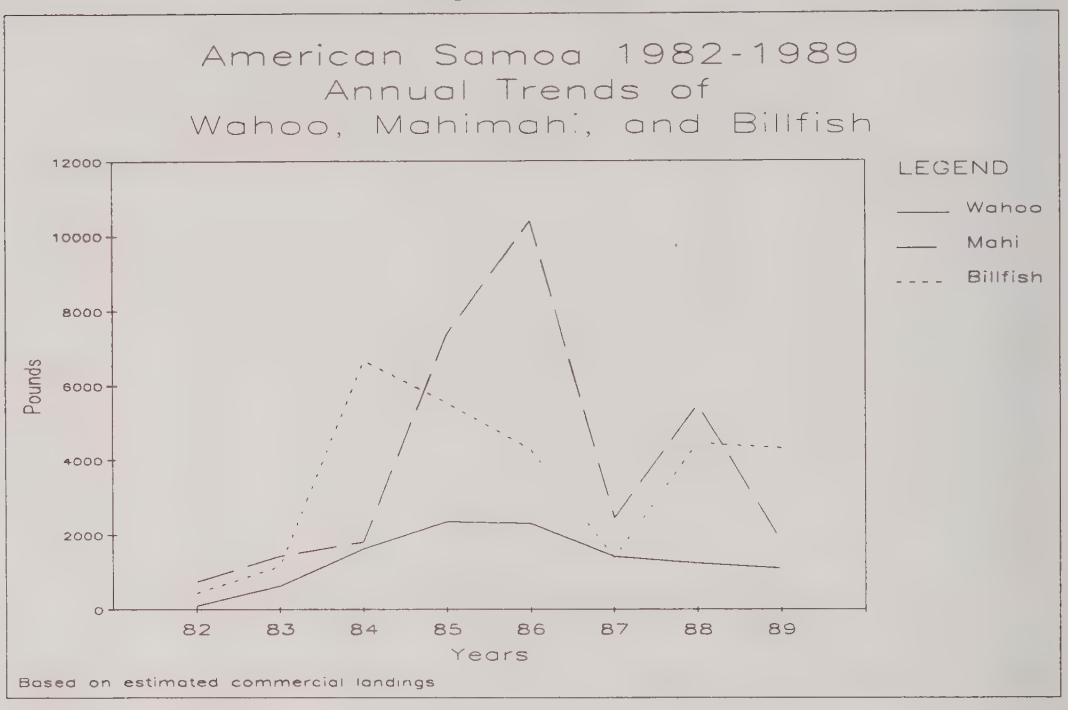

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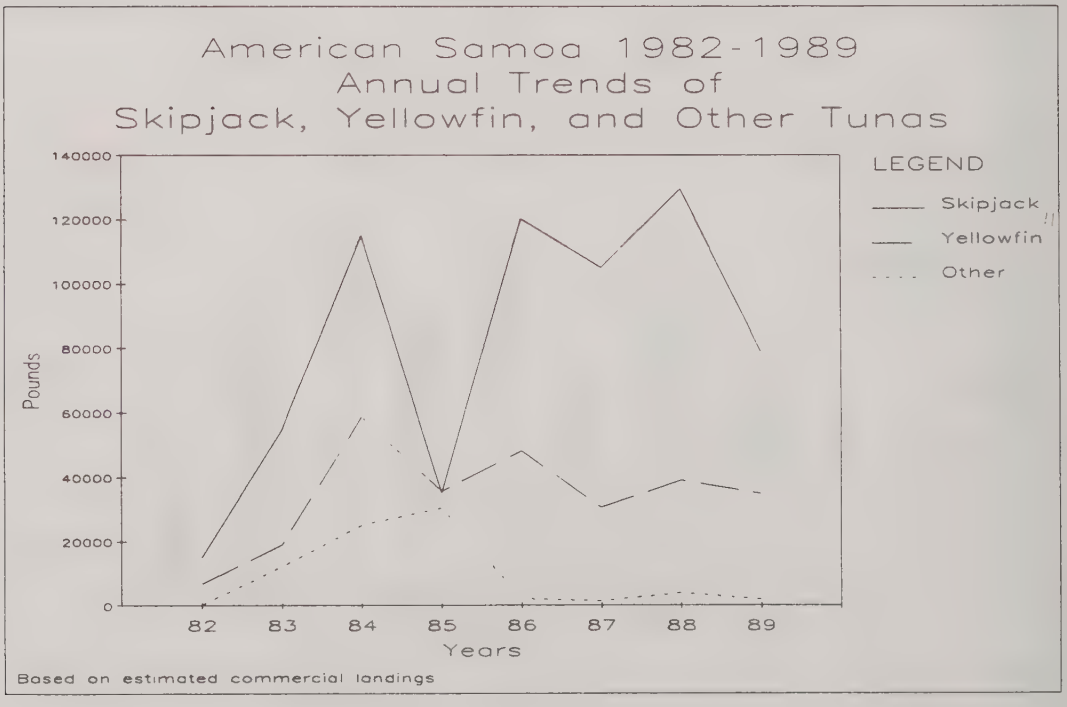

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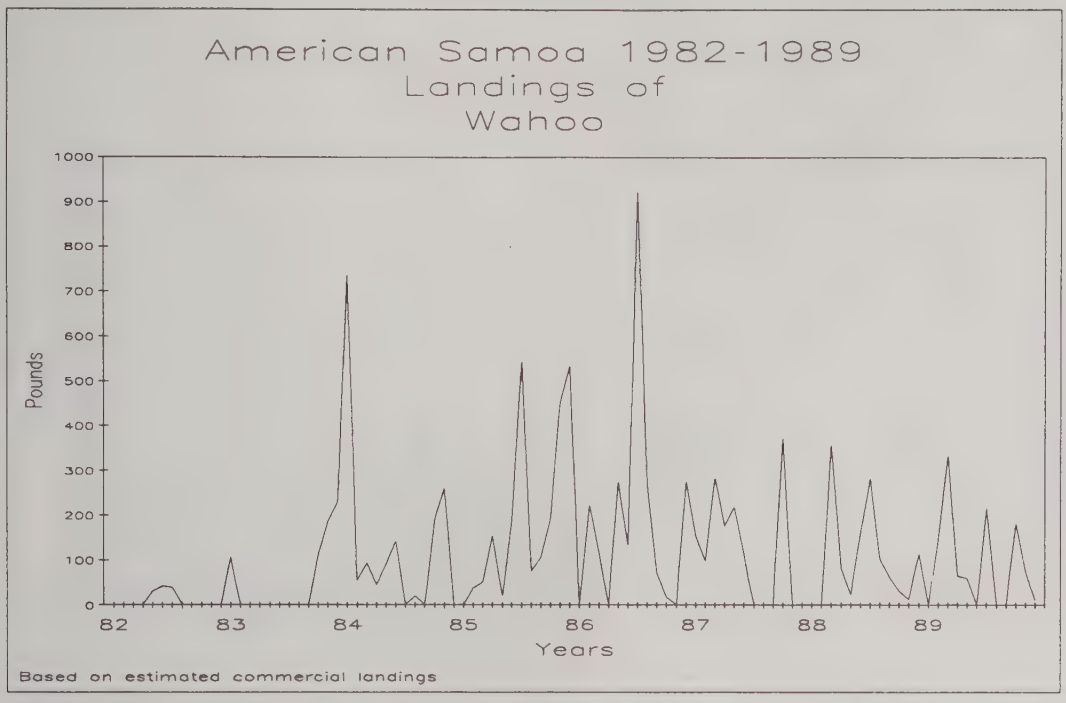

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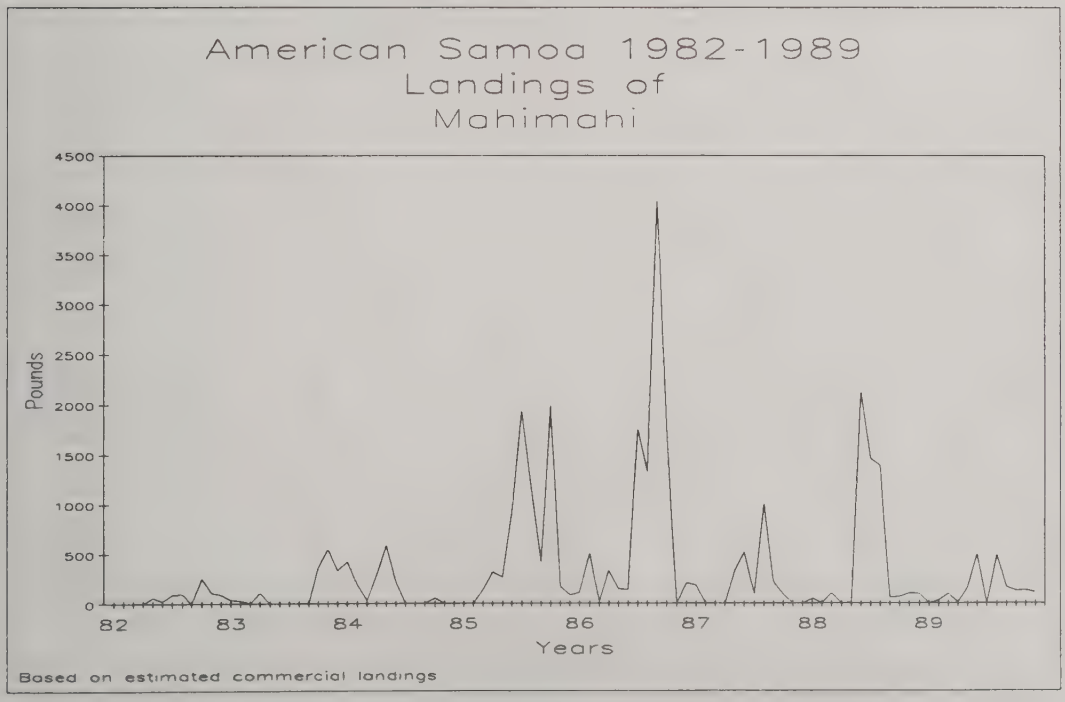

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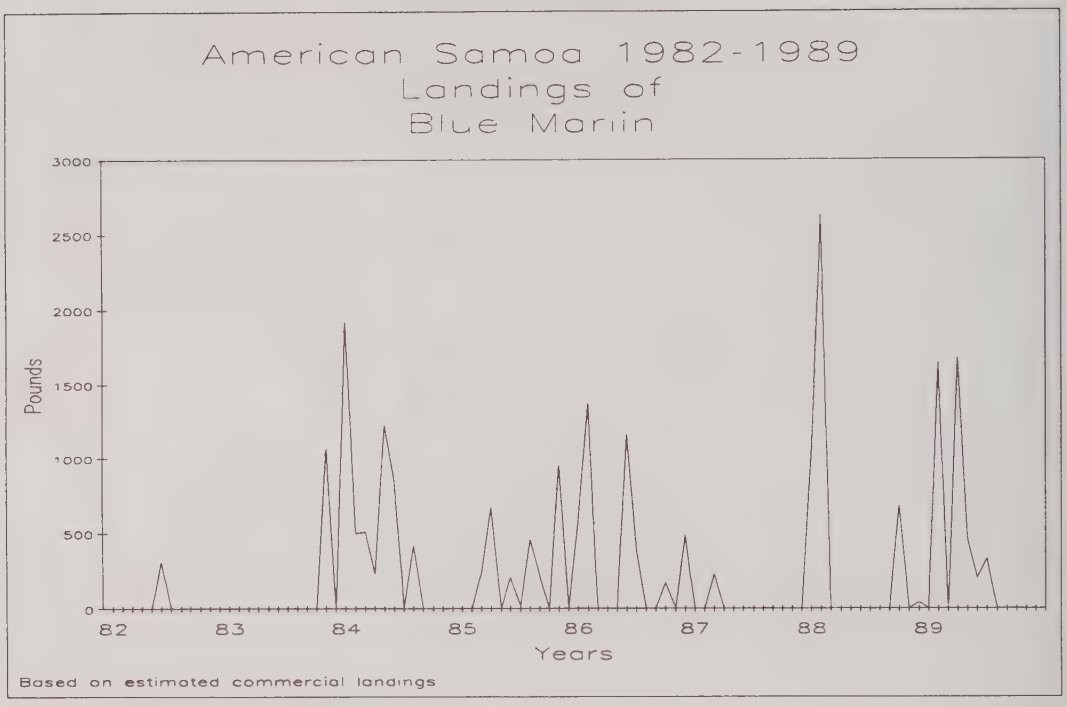

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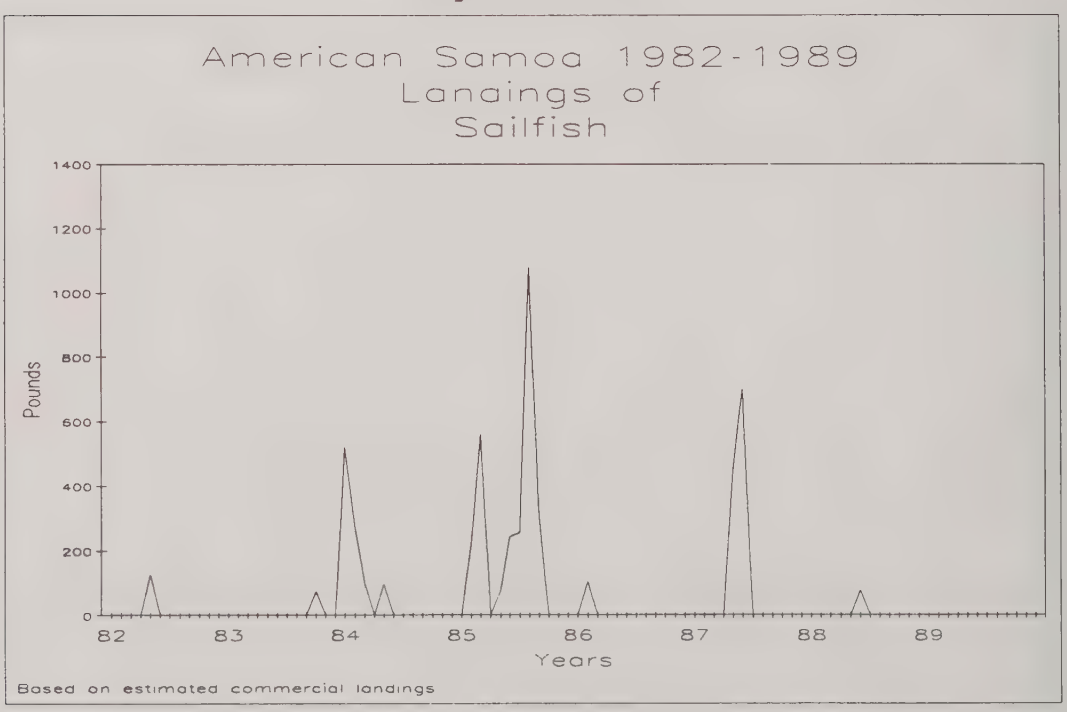

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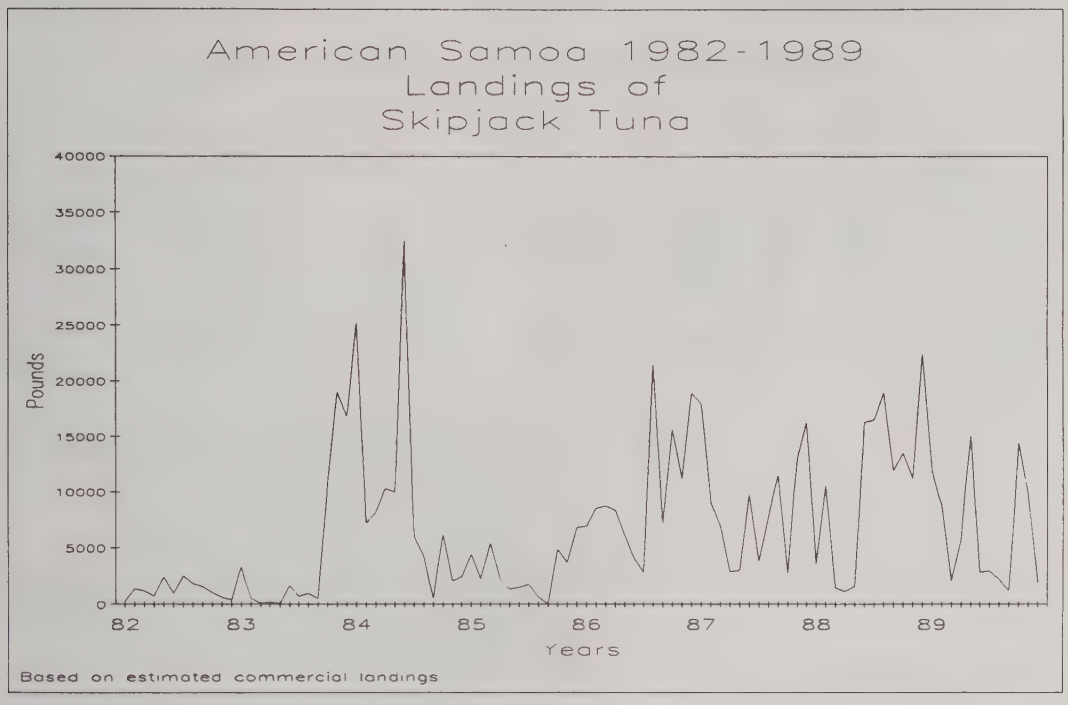
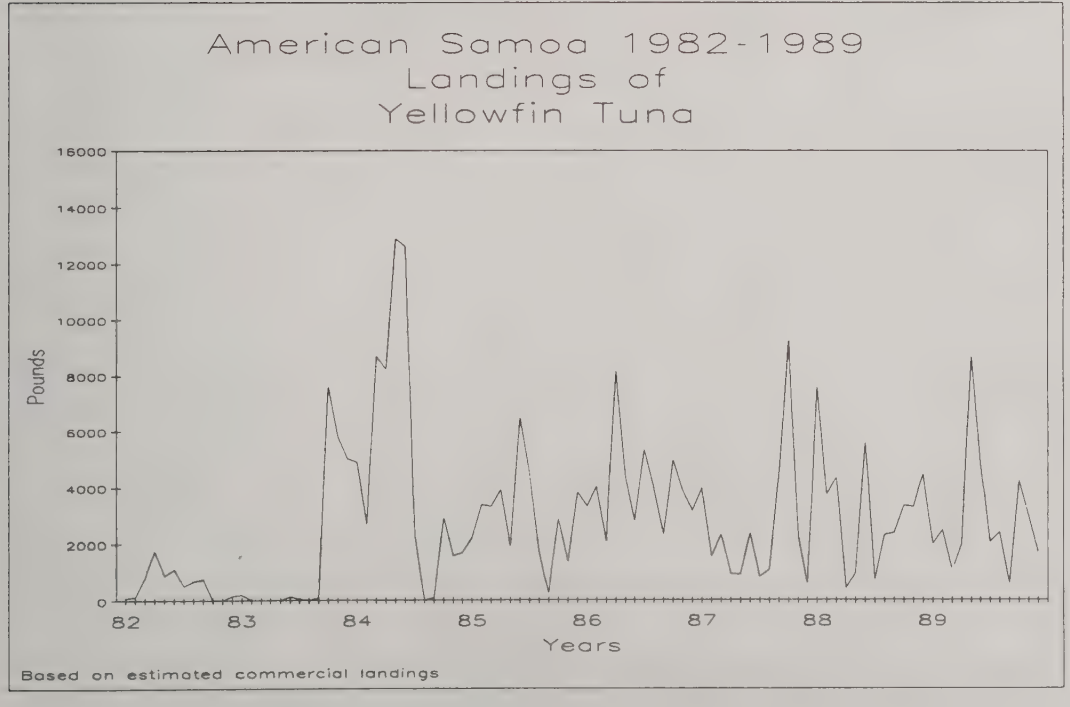


Figure II.4.6



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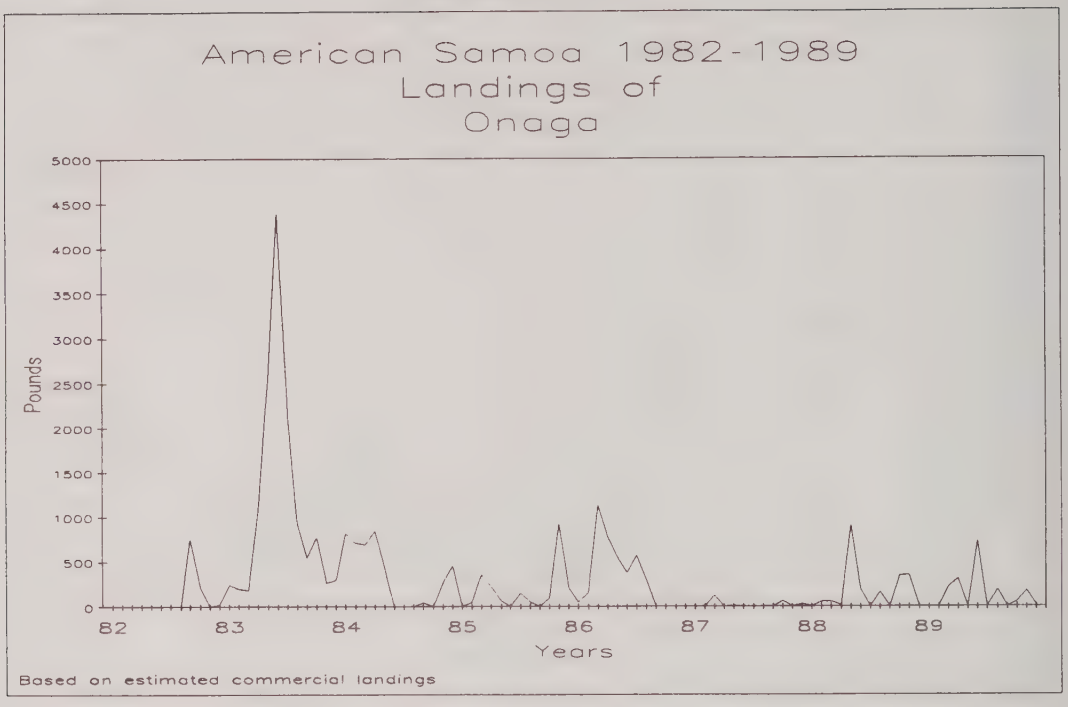

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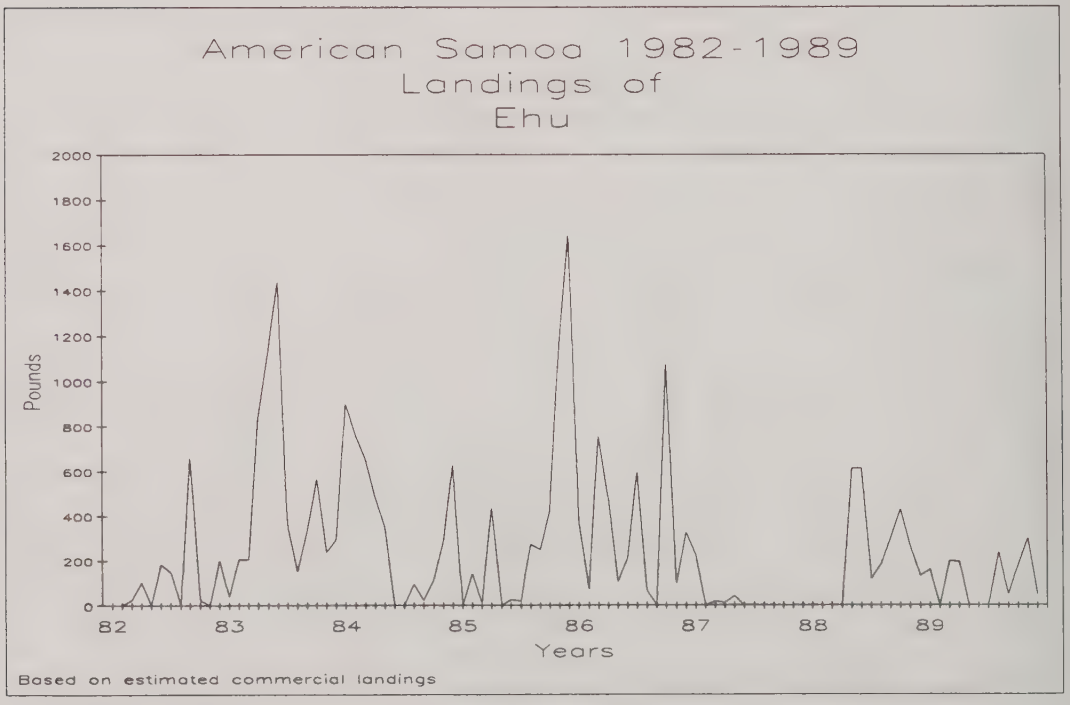


Table II.3.1

Tutuila 1989 Annual
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	162799.3	9	6853.4	7	1011.9	7	22489.1	7	3350.5	7	23.8	7
Bottom Fish	16967.4	16	974.9	16	110.3	16	2658.1	17	294.9	16	16.9	8
Troll-Bottom	35297.8	19	2059.3	17	114.8	14	7227.5	22	376.3	17	18.4	14
Spearing	51660.2	20	1383.1	14	149.0	14	6957.4	14	744.4	14	38.7	19
Long Line	0	0	17.9	77	4.5	77	53.7	77	13.4	77	0	0*
Total:	266724.6	7	11288.6	6	1365.9	6	39385.7	7	4712.5	6	24.5	5

* Not enough data to properly compute Coefficient of Variation (CV).

Table II.3.2

Tutuila 1989 Annual
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	2155.5	0.81	Black Jack	1355.5	0.51
Trevally	488.5	0.18	Barracudas	743.3	0.28
Large Barracuda	831.8	0.31	Small Barracuda	1350.0	0.51
Sharks	4086.1	1.53	Rays	15.9	0.01
Eels	58.3	0.02	Groupers	2129.0	0.80
Peacock Grouper	977.9	0.37	Flagtail Grouper	128.9	0.05
Tomato Grouper	242.5	0.09	Blacktip Grouper	82.7	0.03
Yellowspot Grouper	116.1	0.04	Spotted Grouper	924.9	0.35
Smalltooth Grouper	27.0	0.01	Giant Grouper	369.1	0.14
Lunartail Grouper	3261.1	1.22	Blue Lined Snapper	6159.5	2.31
Rufous Snapper	434.1	0.16	Onespot Snapper	79.5	0.03
Twinspot/Red Snapper	1705.0	0.64	Humpback Snapper	2578.2	0.97
Brown Jobfish	28.5	0.01	Gray Jobfish	2896.0	1.09
Hawaiian Opakapaka	190.9	0.07	Opakapaka	264.5	0.10
Blue Lined Gindai	14.2	0.01	Gindai (Flower Snap)	439.2	0.16
Lehi (Silverjaw)	1454.4	0.55	Onaga (Red Snapper)	1099.9	0.41
Ehu (Red Snapper)	716.3	0.27	Bigeye Emperor	25.9	0.01
Emperors (Misc)	1640.4	0.62	Longnose Emperor	1954.0	0.73
Ambon Emperor	1199.5	0.45	Blueline Bream	58.3	0.02
Orangespot Emperor	49.3	0.02	Redgill Emperor	5049.4	1.89
Rudderfish	97.1	0.04	Lined Surgeon	10727.0	4.02
Yellow Eyed Surgeon	5865.6	2.20	Dussumier's Surgeon	730.4	0.27
Spotted Surgeonfish	385.6	0.14	Unicornfish (Misc)	4475.7	1.68
Unicornfish	2206.8	0.83	Squirrelfish	3831.2	1.44
Saber Squirrelfish	878.1	0.33	Bigeye Squirrelfish	209.8	0.08
Parrotfish	9957.7	3.73	Wrasse	235.1	0.09
Pink Goatfish	122.6	0.05	Inshore Groupers	31.1	0.01
Triggerfish	94.7	0.04	Porcupinefish	149.6	0.06
Red Snapper, MU	273.6	0.10	Troll Fish	629.9	0.24
Dolphin (Mahimahi)	2961.7	1.11	Blue Marlin	9693.6	3.63
Sailfish	784.7	0.29	Rainbow Runner	525.1	0.20
Wahoo	1190.6	0.45	Tunas	122.8	0.05
Skipjack Tuna	110882.5	41.57	Dogtooth Tuna	2419.5	0.91
Yellowfin Tuna	42785.3	16.04	Kawakawa	439.4	0.16
Crabs	155.4	0.06	Spiny Lobster	5277.0	1.98
Slipper Lobster	353.6	0.13	Octopus	753.7	0.28
Squid	97.1	0.04			
Total All Species:	266724.7	100.00			

Table II.4.1

Tutuila January 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	22199.8	23	812.1	19	119.2	21	2786.1	24	417.2	27	28.4	13
Bottom Fish	183.4	85	24.5	85	4.1	85	73.4	85	12.2	85	7.5	0*
Troll-Bottom	1571.5	78	19.4	78	3.2	78	116.2	78	19.4	78	81.2	0*
Spearing	4410.4	47	96.8	41	9.7	38	542.1	43	51.6	39	40.8	55*
Total:	28365.1	21	952.7	18	136.2	20	3517.8	21	500.4	23	29.9	11

Table II.4.2

Tutuila February 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	13614.4	17	536.3	18	73.4	18	2021.0	18	277.3	18	28.0	24
Bottom Fish	1432.1	49	112.0	39	14.0	33	273.4	46	32.1	34	11.7	31
Troll-Bottom	406.3	55	43.4	53	5.8	49	159.1	50	23.1	51	9.1	15*
Spearing	10276.8	38	199.4	33	18.6	32	982.5	31	92.8	30	45.7	60*
Total:	25729.7	15	891.1	18	111.7	18	3435.9	19	425.4	19	35.0	18

Table II.4.3

Tutuila March 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	6184.8	42	427.2	43	64.6	40	1373.1	49	207.5	44	18.0	43
Troll-Bottom	599.0	82	30.1	82	3.8	82	60.3	82	7.5	82	19.9	0*
Spearing	7294.9	38	336.8	31	35.5	32	1575.8	35	168.7	36	20.9	59*
Long Line	0	0	20.1	82	5.0	82	60.3	82	15.1	82	0	0*
Total:	14078.7	30	814.2	29	108.9	31	3069.5	30	398.9	31	17.8	15

* Not enough data to properly compute Coefficient of Variation (CV).

Table II.4.4

Tutuila April 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	17371.8	34	699.5	16	97.2	16	2481.2	15	343.2	16	21.5	17
Bottom Fish	1802.9	61	69.1	58	7.4	57	261.1	57	29.7	59	24.9	0*
Spearing	1201.6	54	46.0	50	6.6	49	184.1	50	26.3	49	25.3	32*
Total:	20376.3	31	814.6	17	107.3	16	2926.4	16	384.0	16	22.0	16

Table II.4.5

Tutuila May 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	29599.4	20	1089.6	15	155.6	15	3273.4	15	485.8	16	16.1	15
Bottom Fish	2942.6	35	194.2	36	25.3	33	406.7	34	54.3	32	11.0	30
Troll-Bottom	3185.4	71	211.7	69	7.4	55	970.3	74	26.1	61	13.5	0*
Spearing	2278.8	57	101.4	60	12.5	55	546.9	61	66.9	56	12.1	18
Total:	38006.2	18	1596.8	16	196.5	14	5197.3	20	624.3	16	14.7	15

Table II.4.6

Tutuila June 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	9466.7	25	451.3	24	70.5	28	1270.0	27	203.9	31	6.1	20
Troll-Bottom	0	0	94.7	85	4.3	85	0	0	0	0	0	0*
Spearing	14655.8	77	75.9	58	7.0	59	508.8	62	48.1	64	58.3	124
Total:	24122.5	51	621.9	25	77.5	25	1778.8	25	252.1	26	8.1	23

* Not enough data to properly compute Coefficient of Variation (CV).

Table II.4.7

Tutuila July 1989
Offshore Creel Survey Expansion Summary

Gear	catch	cv	boat hrs	cv	boat cnt	cv	prsn hrs	cv	prsn cnt	cv	cpue	cv
Trolling	5118.4	29	537.5	30	81.9	30	1696.1	32	259.1	32	2.0	0
Bottom Fish	1946.8	50	128.0	60	14.7	58	336.4	57	38.7	55	4.1	49
Troll-Bottom	8198.7	41	403.6	41	25.0	17	1380.2	51	81.1	24	12.7	24
Spearing	6930.1	28	251.1	28	32.2	29	1199.3	29	153.4	30	14.6	27
Total:	22194.0	15	1320.2	19	143.2	19	4612.0	22	495.4	22	5.2	0

Table II.4.8

Tutuila August 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	7232.4	25	454.8	25	65.0	28	1660.7	26	237.0	30	4.3	0
Bottom Fish	3454.6	34	185.1	35	18.0	39	555.3	35	53.9	39	6.0	36
Troll-Bottom	7324.8	32	498.9	23	27.2	22	1433.7	23	82.5	24	6.6	30
Spearing	892.7	80	49.0	80	7.0	80	269.6	80	38.5	80	1.4	100
Total:	18904.6	17	1187.8	14	117.2	17	3919.2	14	411.9	18	3.7	0

Table II.4.9

Tutuila September 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	2018.2	35	253.8	33	33.6	26	869.4	29	119.9	24	1.4	0
Bottom Fish	1191.8	75	38.4	75	2.7	75	230.1	75	16.4	75	2.2	38
Troll-Bottom	1967.5	63	226.0	61	13.7	60	621.0	59	37.7	59	1.0	48
Spearing	2130.1	79	65.1	79	3.4	79	390.4	79	20.5	79	2.3	79
Total:	7307.5	28	583.2	29	53.4	26	2111.0	25	194.5	23	2.3	0

Table II.4.10

Tutuila October 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	26347.7	29	682.4	17	112.2	19	2086.4	19	343.5	20	13.9	16
Bottom Fish	664.0	69	40.5	61	6.8	51	90.1	56	17.1	53	3.7	60
Troll-Bottom	681.1	77	50.5	77	3.2	77	100.9	77	6.3	77	1.9	293*
Spearing	1270.7	77	33.1	77	3.2	77	198.6	77	18.9	77	7.7	229*
Total:	28963.5	25	806.5	17	121.6	18	2476.0	18	375.0	19	12.7	8

Table II.4.11

Tutuila November 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	19015.5	22	710.7	22	112.3	20	2365.9	23	375.6	21	24.6	29
Bottom Fish	2004.3	39	129.5	36	11.8	35	289.8	36	26.6	36	12.3	28
Troll-Bottom	7619.7	34	435.2	34	20.4	31	1748.8	51	71.4	43	14.2	69*
Spearing	1117.0	51	76.1	54	8.6	53	303.3	51	34.9	51	7.8	122*
Total:	29756.5	18	1351.4	20	153.1	18	4707.9	28	508.4	21	15.0	18

Table II.4.12

Tutuila December 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	3064.8	33	207.4	35	25.5	34	717.8	36	87.9	35	2.2	0
Bottom Fish	530.8	77	22.0	77	2.8	77	44.0	77	5.5	77	3.0	85
Troll-Bottom	4368.8	79	81.3	79	3.1	79	650.0	79	25.0	79	6.7	310*
Spearing	1142.2	52	59.4	53	6.3	52	312.5	53	34.4	55	5.7	181*
Total:	9106.4	38	370.0	25	37.6	24	1724.3	32	152.8	23	4.3	0

* Not enough data to properly compute Coefficient of Variation (CV).

Table II.5.1

Tutuila January 1989
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	306.6	1.08	Black jack	63.2	0.22
Peacock grouper	130.7	0.46	Spotted grouper	150.1	0.53
Lunartail grouper	546.6	1.93	Blue lined snapper	96.8	0.34
Humpback snapper	340.4	1.20	Emperors (misc)	290.4	1.02
Ambon emperor	269.0	0.95	Lined surgeon	858.4	3.03
Yellow eyed surgeon	480.8	1.70	Dussumier's surgeon	80.7	0.28
Spotted surgeonfish	38.7	0.14	Unicornfish (misc)	293.7	1.04
Squirrelfish	572.8	2.02	Parrotfish	616.3	2.17
Wrasse	195.2	0.69	Dolphin (mahimahi)	107.5	0.38
Blue marlin	394.2	1.39	Rainbow runner	114.7	0.40
Skipjack tuna	15910.7	56.09	Dogtooth tuna	691.8	2.44
Yellowfin tuna	5317.9	18.75	Kawakawa	50.2	0.18
Spiny lobster	447.7	1.58			
Total all species:	28365.1	100.00			

Table II.5.2

Tutuila February 1989
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Black jack	317.0	1.23	Small barracuda	218.0	0.85
Sharks	738.4	2.87	Groupers	503.4	1.96
Peacock grouper	339.3	1.32	Tomato grouper	118.9	0.46
Spotted grouper	118.4	0.46	Lunartail grouper	504.8	1.96
Blue lined snapper	295.1	1.15	Humpback snapper	150.1	0.58
Brown jobfish	26.8	0.10	Gray jobfish	34.7	0.13
Lehi (silverjaw)	46.3	0.18	Emperors (misc)	559.5	2.17
Ambon emperor	81.9	0.32	Blueline bream	58.5	0.23
Rudderfish	97.5	0.38	Lined surgeon	1653.5	6.43
Yellow eyed surgeon	743.9	2.89	Spotted surgeonfish	31.2	0.12
Unicornfish (misc)	1134.8	4.41	Unicornfish	189.1	0.74
Squirrelfish	850.2	3.30	Bigeye squirrelfish	210.6	0.82
Parrotfish	2000.6	7.78	Triggerfish	23.1	0.09
Porcupinefish	60.5	0.23	Blue marlin	2073.0	8.06
Rainbow runner	124.0	0.48	Wahoo	95.4	0.37
Skipjack tuna	8672.0	33.70	Dogtooth tuna	50.3	0.20
Yellowfin tuna	1945.2	7.56	Kawakawa	119.20	0.46
Spiny lobster	1091.9	4.24	Slipper lobster	354.9	1.38
Squid	97.5	0.38			
Total all species:	25729.7	100.00			

Table II.5.3

Tutuila March 1989
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Black jack	22.6	0.16	Groupers	642.3	4.56
Peacock grouper	45.2	0.32	Onaga (red snapper)	169.5	1.20
Ehu (red snapper)	150.7	1.07	Lined surgeon	1998.7	14.20
Yellow eyed surgeon	1099.6	7.81	Spotted surgeonfish	155.4	1.10
Unicornfish	650.0	4.62	Squirrelfish	462.4	3.28
Parrotfish	1294.8	9.20	Porcupinefish	41.1	0.29
Dolphin (mahimahi)	97.1	0.69	Blue marlin	2226.6	15.82
Wahoo	440.6	3.13	Skipjack tuna	2518.1	17.89
Yellowfin tuna	1113.3	7.91	Spiny lobster	950.6	6.75
Total all species:	14078.7	100.00			

Table II.5.4

Tutuila April 1989
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Trevally	54.1	0.27	Barracudas	21.5	0.11
Sharks	216.7	1.06	Groupers	105.2	0.52
Lunartail grouper	256.3	1.26	Blue lined snapper	194.9	0.96
Gray jobfish	162.4	0.80	Opakapaka	55.9	0.27
Onaga (red snapper)	234.6	1.15	Ehu (red snapper)	198.5	0.97
Emperors (misc)	55.9	0.27	Longnose emperor	21.7	0.11
Ambon emperor	234.6	1.15	Lined surgeon	203.8	1.00
Yellow eyed surgeon	82.2	0.40	Unicornfish (misc)	115.1	0.56
Unicornfish	124.9	0.61	Squirrelfish	118.4	0.58
Saber squirrelfish	198.5	0.97	Parrotfish	422.5	2.07
Pink goatfish	92.0	0.45	Troll Spec	626.8	3.08
Dolphin (mahimahi)	284.8	1.40	Blue marlin	1893.0	9.29
Rainbow runner	43.3	0.21	Wahoo	91.3	0.45
Skipjack tuna	10408.7	51.08	Yellowfin tuna	3829.0	18.79
Spiny lobster	29.6	0.15			
Total all species:	20376.3	100.00			

Table II.5.5

Tutuila May 1989
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	318.7	0.84	Black jack	243.7	0.64
Barracudas	35.9	0.09	Small barracuda	281.4	0.74
Sharks	492.8	1.30	Groupers	42.2	0.11
Tomato grouper	88.7	0.23	Lunartail grouper	308.9	0.81
Blue lined snapper	764.0	2.01	Twinspot/red snapper	393.7	1.04
Humpback snapper	328.7	0.86	Gray jobfish	232.2	0.61
Blue lined gindai	16.9	0.04	Lehi (silverjaw)	135.1	0.36
Bigeye emperor	16.9	0.04	Emperors (misc)	181.5	0.48
Ambon emperor	514.4	1.35	Orangespot emperor	58.1	0.15
Redgill emperor	793.7	2.09	Lined surgeon	557.9	1.47
Yellow eyed surgeon	339.2	0.89	Unicornfish (misc)	104.7	0.28
Unicornfish	335.0	0.88	Squirrelfish	294.4	0.77
Saber squirrelfish	147.8	0.39	Parrotfish	623.9	1.64
Triggerfish	25.3	0.07	Dolphin (mahimahi)	219.0	0.58
Blue marlin	2284.7	6.01	Tunas	21.1	0.06
Skipjack tuna	17136.1	45.09	Dogtooth tuna	345.0	0.91
Yellowfin tuna	10071.7	26.50	Kawakawa	60.2	0.16
Spiny lobster	125.6	0.33	Octopus	67.0	0.18
Total all species:	38006.1	100.00			

Table II.5.6

Tutuila June 1989
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	222.0	0.92	Trevally	540.4	2.24
Barracudas	168.9	0.70	Small barracuda	23.8	0.10
Eels	26.5	0.11	Groupers	306.4	1.27
Spotted grouper	776.8	3.22	Giant grouper	458.4	1.90
Humpback snapper	569.3	2.36	Lined surgeon	1640.5	6.80
Yellow eyed surgeon	1059.1	4.39	Dussumier's surgeon	786.5	3.26
Unicornfish (misc)	2583.8	10.71	Squirrelfish	108.6	0.45
Saber squirrelfish	670.7	2.78	Parrotfish	2841.9	11.78
Porcupinefish	72.4	0.30	Dolphin (mahimahi)	380.5	1.58
Blue marlin	198.2	0.82	Skipjack tuna	3723.7	15.44
Dogtooth tuna	99.1	0.41	Yellowfin tuna	5025.7	20.83
Kawakawa	15.9	0.07	Spiny lobster	1351.0	5.60
Octopus	472.8	1.96			
Total all species:	24122.5	100.00			

Table II.5.7

Tutuila July 1989
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	416.3	1.88	Black jack	94.6	0.43
Barracudas	169.2	0.76	Large barracuda	53.9	0.24
Small barracuda	84.8	0.38	Sharks	959.5	4.32
Groupers	104.2	0.47	Peacock grouper	49.4	0.22
Flagtail grouper	63.8	0.29	Blacktip grouper	32.9	0.15
Yellowspot grouper	47.3	0.21	Lunartail grouper	232.4	1.05
Blue lined snapper	1038.4	4.68	Twinspot/red snapper	649.8	2.93
Humpback snapper	296.8	1.34	Gray jobfish	637.5	2.87
Hawaiian opakapaka	20.6	0.09	Lehi (silverjaw)	41.1	0.19
Bigeye emperor	11.0	0.05	Emperors (misc)	402.6	1.81
Longnose emperor	821.2	3.70	Ambon emperor	123.4	0.56
Redgill emperor	927.8	4.18	Lined surgeon	2126.7	9.58
Yellow eyed surgeon	1085.3	4.89	Spotted surgeonfish	124.2	0.56
Unicornfish (misc)	372.7	1.68	Unicornfish	544.5	2.45
Squirrelfish	434.3	1.96	Parrotfish	1374.0	6.19
Inshore groupers	29.2	0.13	Red snapper, mu	199.8	0.90
Dolphin (mahimahi)	153.5	0.69	Blue marlin	322.0	1.45
Rainbow runner	20.6	0.09	Wahoo	394.8	1.78
Skipjack tuna	3576.0	16.11	Dogtooth tuna	380.4	1.71
Yellowfin tuna	2684.5	12.10	Kawakawa	30.0	0.13
Crabs	18.3	0.08	Spiny lobster	884.3	3.98
Octopus	160.8	0.72			
Total all species:	22194.0	100.00			

Table II.5.8

Tutuila August 1989
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	393.9	2.08	Black jack	74.0	0.39
Barracudas	279.2	1.48	Small barracuda	137.7	0.73
Sharks	51.8	0.27	Groupers	116.7	0.62
Peacock grouper	127.1	0.67	Flagtail grouper	86.4	0.46
Tomato grouper	53.6	0.28	Blacktip grouper	62.2	0.33
Yellowspot grouper	86.4	0.46	Smalltooth grouper	29.4	0.16
Lunartail grouper	264.3	1.40	Blue lined snapper	1515.8	8.02
Rufous snapper	426.3	2.25	Onespot snapper	86.4	0.46
Humpback snapper	351.5	1.86	Gray jobfish	945.2	5.00
Opakapaka	200.3	1.06	Gindai (flower snap)	238.4	1.26
Lehi (silverjaw)	161.4	0.85	Onaga (red snapper)	193.5	1.02
Ehu (red snapper)	202.9	1.07	Emperors (misc)	55.3	0.29
Longnose emperor	369.7	1.96	Ambon emperor	62.2	0.33
Redgill emperor	938.4	4.96	Lined surgeon	280.1	1.48
Yellow eyed surgeon	105.0	0.56	Unicornfish (misc)	70.0	0.37
Squirrelfish	203.5	1.08	Saber squirrelfish	14.8	0.08
Parrotfish	161.0	0.85	Pink goatfish	34.6	0.18
Triggerfish	2.1	0.17	Red snapper, mu	100.7	0.53
Dolphin (mahimahi)	742.8	3.93	Blue marlin	464.4	2.46
Rainbow runner	96.3	0.51	Skipjack tuna	4855.3	25.68
Dogtooth tuna	242.6	1.28	Yellowfin tuna	3778.1	19.98
Spiny lobster	87.5	0.46	Octopus	126.0	0.67
Total all species:	18904.6	100.00			

Table II.5.9

Tutuila September 1989
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	68.5	0.94	Black jack	178.1	2.44
Small barracuda	328.8	4.50	Sharks	356.6	4.88
Rays	17.1	0.23	Groupers	73.6	1.01
Lunartail grouper	68.5	0.94	Blue lined snapper	508.9	6.96
Twinspot/red snapper	328.8	4.50	Gray jobfish	320.5	4.39
Lehi (silverjaw)	61.6	0.84	Ehu (red snapper)	51.4	0.70
Emperors (misc)	38.4	0.52	Redgill emperor	293.2	4.01
Lined surgeon	599.3	8.20	Yellow eyed surgeon	428.1	5.86
Unicornfish	287.7	3.94	Squirrelfish	332.2	4.55
Parrotfish	291.1	3.98	Dolphin (mahimahi)	345.2	4.72
Tunas	61.6	0.84	Skipjack tuna	1369.1	18.74
Yellowfin tuna	561.9	7.69	Kawakawa	77.1	1.05
Crabs	119.9	1.64	Spiny lobster	140.4	1.92
Total all species:	7307.5	100.00			

Table II.5.10

Tutuila October 1989
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	125.3	0.43	Large barracuda	96.8	0.33
Sharks	293.8	1.01	Eels	30.0	0.10
Groupers	133.0	0.46	Lunartail grouper	38.3	0.13
Blue lined snapper	79.8	0.28	Twinspot/red snapper	51.1	0.18
Humpback snapper	167.8	0.58	Lehi (silverjaw)	412.1	1.42
Ehu (red snapper)	100.9	0.35	Redgill emperor	159.6	0.55
Lined surgeon	268.0	0.93	Yellow eyed surgeon	200.2	0.69
Squirrelfish	170.3	0.59	Parrotfish	304.3	1.05
Dolphin (mahimahi)	232.2	0.80	Blue marlin	439.8	1.52
Sailfish	767.0	2.65	Rainbow runner	114.3	0.39
Wahoo	134.6	0.46	Tunas	47.3	0.16
Skipjack tuna	22308.8	77.02	Dogtooth tuna	63.3	0.22
Yellowfin tuna	2105.2	7.27	Spiny lobster	119.8	0.41
Total all species:	28963.5	100.00			

Table II.5.11

Tutuila November 1989
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	398.7	1.34	Black jack	132.1	0.44
Barracudas	130.9	0.44	Small barracuda	239.1	0.80
Sharks	643.1	2.16	Groupers	254.0	0.85
Peacock grouper	247.3	0.83	Lunartail grouper	957.3	3.22
Blue lined snapper	1386.0	4.66	Humpback snapper	426.5	1.43
Gray jobfish	498.4	1.67	Hawaiian opakapaka	160.0	0.54
Lehi (silverjaw)	241.4	0.81	Emperors (misc)	117.4	0.39
Longnose emperor	826.1	2.78	Redgill emperor	1597.0	5.37
Lined surgeon	332.3	1.12	Yellow eyed surgeon	191.1	0.64
Unicornfish (misc)	94.1	0.32	Unicornfish	60.8	0.20
Squirrelfish	179.8	0.60	Parrotfish	250.5	0.84
Triggerfish	11.7	0.04	Dolphin (mahimahi)	255.0	0.86
Wahoo	98.4	0.33	Skipjack tuna	16339.6	54.91
Yellowfin tuna	3618.1	12.16	Kawakawa	65.6	0.22
Spiny lobster	4.3	0.01			
Total all species:	29756.4	100.00			

Table II.5.12

Tutuila December 1989
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	25.0	0.27	Black jack	186.3	2.05
Large barracuda	671.9	7.38	Small barracuda	44.0	0.48
Sharks	375.0	4.12	Blue lined snapper	313.1	3.44
Twinspot/red snapper	366.3	4.02	Humpback snapper	33.0	0.36
Gray jobfish	28.4	0.31	Lehi (silverjaw)	99.0	1.09
Redgill emperor	317.3	3.48	Lined surgeon	343.8	3.77
Yellow eyed surgeon	153.1	1.68	Spotted surgeonfish	46.9	0.51
Unicornfish (misc)	62.5	0.69	Unicornfish	65.6	0.72
Squirrelfish	84.4	0.93	Parrotfish	157.8	1.73
Dolphin (mahimahi)	93.6	1.03	Wahoo	62.5	0.69
Skipjack tuna	1721.3	18.90	Dogtooth tuna	259.8	2.85
Yellowfin tuna	3321.1	36.47	Spiny lobster	275.0	3.02
Total all species:	9106.5	100.00			

Figure II.5.1

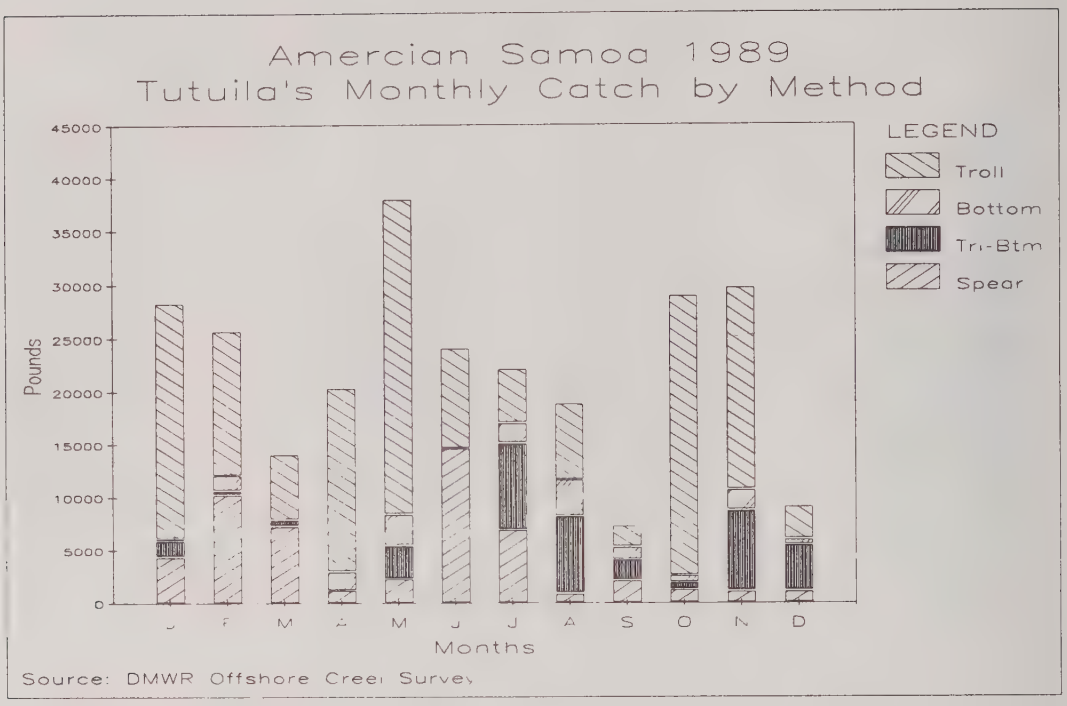


Figure II.5.2

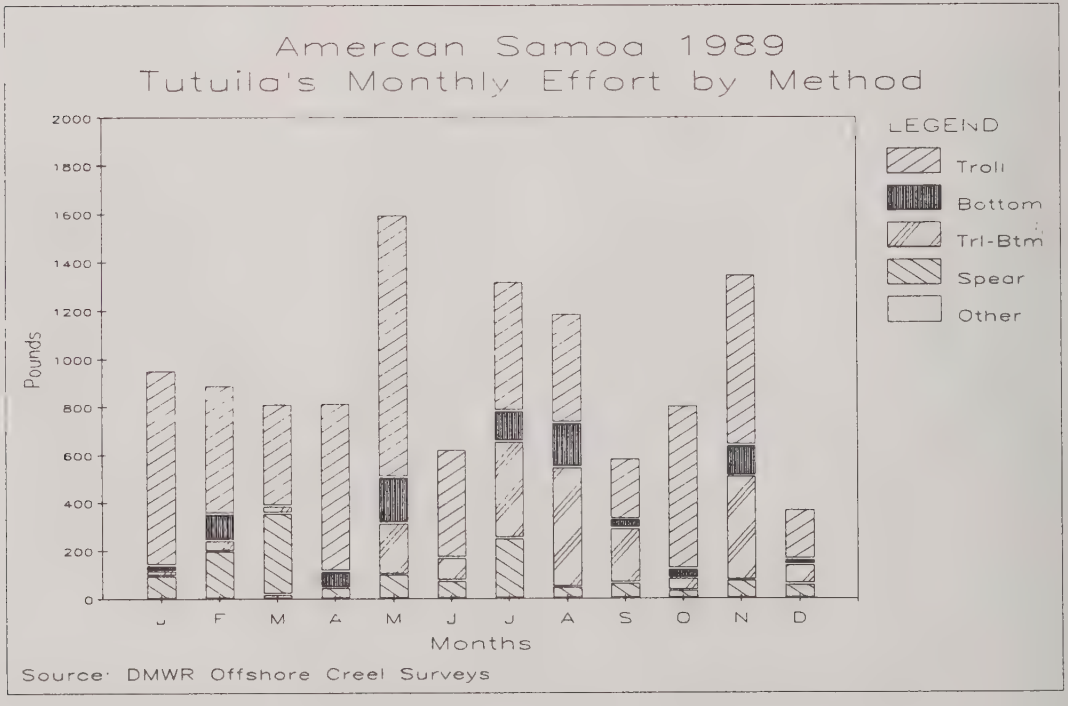
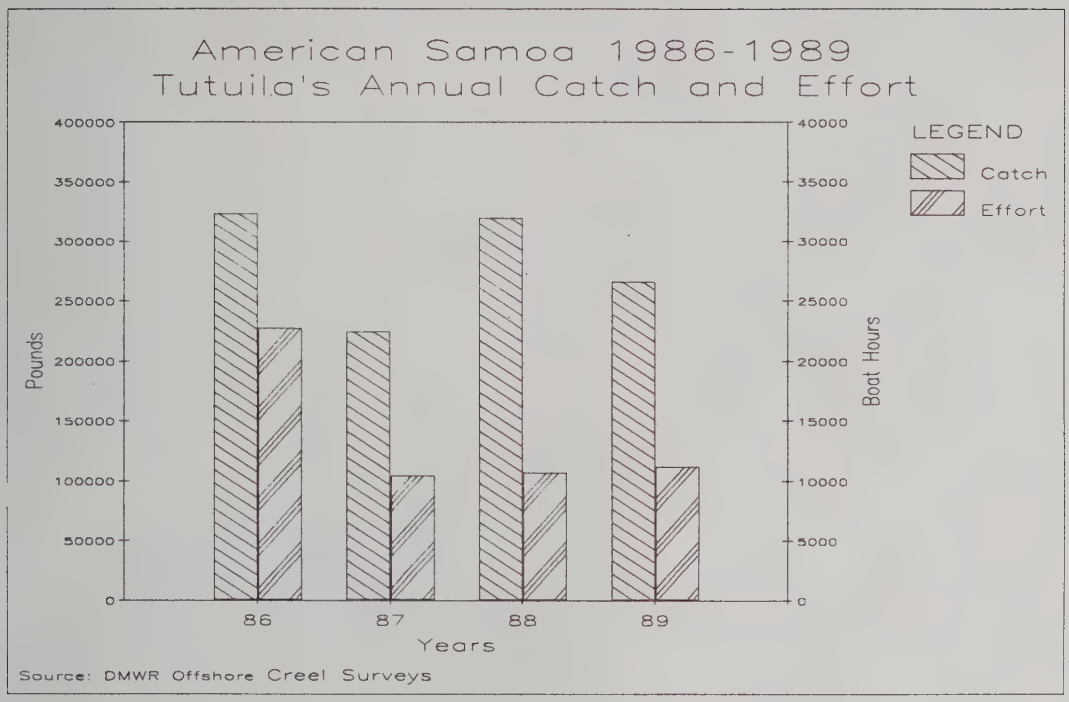


Figure II.5.3


American Samoa 1986-1989
Tutuila's Annual Catch and Effort
LEGEND
Catch
Effort
Pounds
Boat Hours
400000
350000
300000
250000
200000
150000
100000
50000
0
40000
35000
30000
25000
20000
15000
10000
5000
0
86
87
88
89
Years
Source: DMWR Offshore Creel Surveys

Commonwealth of the Northern Mariana Islands

Fishery Statistics 1989

COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS
1989 FISHERY STATISTICS

Compiled by

Division of Fish and Wildlife

and the

Western Pacific Fishery Information Network

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CONTENTS

	Page
Introduction	III.1
Data Collecting System	III.1
Data Processing System	III.2
Data Reporting System	III.3
Tables and Figures	III.5

LIST OF CNMI SUMMARY TABLES

Table	Title	Page
III.1.1	CNMI 1989 Annual Commercial Landings	III.5
III.1.2	CNMI January 1989 Commercial Landings	III.6
III.1.3	CNMI February 1989 Commercial Landings	III.7
III.1.4	CNMI March 1989 Commercial Landings	III.8
III.1.5	CNMI April 1989 Commercial Landings	III.9
III.1.6	CNMI May 1989 Commercial Landings	III.9
III.1.7	CNMI June 1989 Commercial Landings	III.10
III.1.8	CNMI July 1989 Commercial Landings	III.11
III.1.9	CNMI August 1989 Commercial Landings	III.11
III.1.10	CNMI September 1989 Commercial Landings	III.12
III.1.11	CNMI October 1989 Commercial Landings	III.12
III.1.12	CNMI November 1989 Commercial Landings	III.13
III.1.13	CNMI December 1989 Commercial Landings	III.14

LIST OF CNMI FIGURES

Table	Title	Page
III.1.1	CNMI 1989 Fisheries Categories: Pelagic, Bottom, Reef, and Other	III.15
III.1.2	CNMI 1989 Monthly Landings of Tunas, PMUS, and BMUS	III.15
III.1.3	CNMI 1989 Monthly Landings of Wahoo, Mahimahi, and Billfish	III.16
III.1.4	CNMI 1989 Monthly Landings of Skipjack, Yellowfin, and Other Tunas	III.16
III.2.1	CNMI 1979-1989 Average Monthly Landings of Tunas, PMUS, and BMUS	III.17
III.2.2	CNMI 1979-1989 Average Monthly Landings of Wahoo and Mahimahi	III.17
III.2.3	CNMI 1979-1989 Average Monthly Landings of Blue Marlin And Sailfish	III.18
III.2.4	CNMI 1979-1989 Average Monthly Landings of Skipjack, Yellowfin, and Other Tunas	III.18
III.2.5	CNMI 1979-1989 Average Monthly Landings of BMUS, Emperor, and Grouper	III.19
III.3.1	CNMI 1979-1989 Annual Trend of Fisheries Categories: Pelagic, Bottom, Reef, and Other	III.19
III.3.2	CNMI 1979-1989 Annual Trends of Total Commercial Landings	III.20
III.3.3	CNMI 1979-1989 Annual Trends of Tunas, PMUS, and BMUS Landings	III.20
III.3.4	CNMI 1979-1989 Annual Trends of Wahoo, Mahimahi, and Billfish	III.21
III.3.5	CNMI 1979-1989 Annual Trends of Skipjack, Yellowfin, and Other Tunas	III.21
III.4.1	CNMI 1979-1989 Landings of Wahoo	III.22
III.4.2	CNMI 1979-1989 Landings of Mahimahi	III.22
III.4.3	CNMI 1979-1989 Landings of Marlin	III.23
III.4.4	CNMI 1979-1989 Landings of Sailfish	III.23
III.4.5	CNMI 1979-1989 Landings of Skipjack Tuna	III.24
III.4.6	CNMI 1979-1989 Landings of Yellowfin Tuna	III.24
III.4.7	CNMI 1979-1989 Landings of Emperor	III.25
III.4.8	CNMI 1979-1989 Landings of Grouper	III.25

COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS
1989 FISHERY STATISTICS

INTRODUCTION

The Commonwealth of the Northern Mariana Islands (CNMI) comprises a string of islands located at about long. 145° E and extending northward from about lat. 14 to 21° N. About 99% of the approximately 21,000 inhabitants of the CNMI live on the three main islands, Saipan (87%), Rota (7%), and Tinian (5%). The Division of Fish and Wildlife (DFW) has been collecting fishery statistics on the commercial fishing fleet of Saipan since the mid-1970's. In 1983, DFW also began collecting information on vessels transshipping tuna out of Tinian. Significant improvements to the data collecting and processing systems were made in 1982 when microcomputer hardware, software, and training were provided by the WPACFIN program.

The major domestic commercial fishery of the CNMI is a small boat, one-day troll fishery. Most of the boats are 12- to 24-foot outboard-powered, runabout-type vessels; however, a few larger boats are also used. In the past few years, there has been a fairly rapid increase in the number of boats in the CNMI, about 70% of which are used in the commercial fisheries. Although trolling is by far the most common fishing method, many boats are also used for bottom fishing and reef fishing activities. Reef fish are an important component of the local diet and are a significant portion of the total commercial catch. Additionally, an increasing amount of reef fish is being imported from other Pacific islands to meet the local demand. In recent years, several larger boats have started fishing more intensively for bottom fish around the islands north of Saipan. The vast majority of the domestic catch is consumed locally, but there have been some exports of fish to Guam and Hawaii.

Beginning in 1983, fishing vessels from several nations began using the Tinian harbor as a port to off-load tuna catches to large transshipment vessels. In 1989, transshipments out of Tinian totaled 52,0000 metric tons, of which 56% were made by 14 U.S. registered purse seiners.

DATA COLLECTING SYSTEM

The principal method used by DFW to collect domestic commercial fisheries data is a dealer invoicing system, sometimes referred to as a "trip ticket" system. The DFW provides numbered two-part invoices to all purchasers of fresh fishery products, including hotels, restaurants, stores, fish markets, and roadside vendors. Dealers complete an invoice each time they purchase fish directly from fishermen. They keep one copy for their records and provide one copy to DFW. Some advantages of this method of data

collection are that it is relatively inexpensive to implement and maintain, nearly complete coverage of the commercial fisheries is fairly easy to accomplish, and DFW can provide feedback to dealers and fishermen to ensure data accuracy and continued cooperation. Disadvantages include a dependence on non-DFW personnel to identify the catch and record the data, the types of data that can be collected are somewhat restricted, education and cooperation of all fish purchasers are required, and only the fish that are actually sold to dealers are recorded and a potentially important portion of the total landings is unrecorded. Since 1982, DFW has tried to minimize these disadvantages as much as possible by maintaining a close working relationship with dealers, by educating and adding new dealers to their list as they enter the business, and by implementing a creel survey to help estimate total catch, including recreational and subsistence catch.

The current system collects data from dealers on the island of Saipan, where DFW estimates over 90% of all CNMI commercial landings are made. The DFW further estimates that the proportion of total commercial landings that is recorded in the data base for Saipan since 1983 is over 90%.

Information collected for each commercial purchase of fish from the fishermen includes the following:

Date
Buyer's name (dealer)
Seller's name (fisherman)
Species
Weight (pounds)
Price per pound
Value
Invoice number

All of these data elements are collected for all purchases of fishery products; however, species identification is frequently made only to a group level, especially for reef fish.

DATA PROCESSING SYSTEM

At the beginning of each month, a DFW employee visits each of the dealers on Saipan to obtain the previous month's invoices, resolve problems, and answer any questions the dealer may have. The invoices are returned to the office for an initial visual edit during the coding process, and are then entered into the "Purchase" data base on the microcomputer. After the records are entered, reports are generated to help verify that all data were entered correctly. On a quarterly basis, copies of the data base are sent to the Honolulu Laboratory, where the data are translated into a different format and transferred to the central computer for additional editing and verification before generation of summary reports. These reports and databases are then ready for use by qualified WPACFIN participants.

DATA REPORTING SYSTEM

After all editing and quality control activities have been accomplished, monthly and annual summary reports by species are generated. Each of the following reports for 1989 contains information on the pounds, value, average price per pound, and number of recorded landings for each species or species groups. The number of recorded landings ("RECORDS" in the tables) is a measurement of how many times each species was landed, regardless of the number or weight of the fish in the landing. This statistic is provided to give an indication of the frequency each species is reported. The POUNDS can be divided by the RECORDS for the average weight of each landing. Each monthly report contains a subtotal for the sum of all species for that month, and the December report also includes the annual total. Annual reports contain the total landings for each species and the total recorded landings for all species for the calendar year.

The following species, species groups, and abbreviations are used in the tables and graphs of CNMI's data:

I. Pelagic Management Unit Species (PMUS)

- Dolphin (mahimahi)
- Marlin
- Shortbill spearfish
- Sailfish
- Wahoo
- Sharks

II. Bottomfish Management Unit Species (BMUS)

- Jacks (unclassified, but excluding bigeye scad)
- Bottom fish (unclassified)
- Ehu (red snapper)
- Gindai (flower snapper)
- Grouper (unclassified)
- Kalikali (pink snapper)
- Lehi (silverjaw snapper)
- Onaga (red or longtail snapper)
- Opakapaka (pink snapper)
- Uku (gray snapper)
- Emperorfish

III. Billfish

- Marlin (probably all blue marlin but could also include the rarely landed striped and black marlin)
- Shortbill spearfish
- Sailfish

IV. Tunas

- Tunas (unclassified)
- Skipjack tuna
- Yellowfin tuna
- Dogtooth tuna

V. Other Tuna

The above tunas excluding skipjack and yellowfin tuna

VI. Fisheries Categories

A. Pelagics

All PMUS and tuna species plus the following:
- Troll fish (unclassified)
- Barracuda
- Rainbow runner

B. Bottom Fish

Same as BMUS

C. Reef Fish

- Reef fish (unclassified)
- Giant wrasse
- Rabbitfish (hitting, hitting feda, menahac, and sesjun)
- Rudderfish
- Squirrelfish
- Parrotfish
- Snapper
- Surgeonfish
- Unicornfish
- Goatfish

D. Other

- Miscellaneous
- Bigeye scad
- Mullet
- Eels
- Milkfish
- Invertebrates (unclassified)
- Crabs (unclassified)
- Coconut crab
- Lobster
- Shrimp
- Octopus
- Squid
- Turtle
- Seaweeds
- Imported

Table III.1.1

CNMI 1989 Annual Commercial Landings

Species	Records	Pounds	Value	$/lb
Assorted	1	90	153	1.70
Bigeye scad (atulai)	105	11,614	23,221	2.00
Mullet	3	277	336	1.21
Bottom fish	194	12,713	23,100	1.82
Gindai (flower snap)	12	805	1,579	1.96
Grouper	7	450	1,060	2.36
Onaga (red snapper)	32	1,982	8,710	4.39
Opakapaka (pink snp)	10	430	902	2.10
Reef fish	944	206,563	322,020	1.56
Wrasse	1	13	23	1.75
Rabbitfish (hitting)	264	6,697	13,135	1.96
Rudderfish (guilli)	9	746	1,540	2.06
Emperor (mafute)	70	3,170	6,028	1.90
Parrotfish	49	13,115	21,169	1.61
Surgeonfish	26	10,720	16,938	1.58
Unicornfish	4	823	1,324	1.61
Goatfish	4	1,591	2,380	1.50
Troll fish	1	249	398	1.60
Barracuda	4	137	189	1.38
Dolphin (mahimahi)	87	5,856	8,689	1.48
Marlin	31	4,563	6,084	1.33
Rainbow runner	1	142	249	1.75
Wahoo	34	1,257	1,961	1.56
Skipjack tuna	1,222	206,162	262,905	1.28
Dogtooth tuna	38	2,974	4,901	1.65
Yellowfin tuna	73	8,087	13,766	1.70
Lobster	175	4,358	14,464	3.32
Octopus	3	56	115	2.04
** TOTAL **	3,404	505,803	757,618	

Table III.1.2

CNMI January 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	1	253	443	1.75
Bottom fish	24	2,007	3,414	1.70
Grouper	1	162	405	2.50
Onaga (red snapper)	3	334	1,837	5.50
Reef fish	78	17,334	27,057	1.56
Rabbitfish (hitting)	29	409	806	1.97
Emperor (mafute)	1	128	237	1.85
Parrotfish	3	156	257	1.65
Surgeonfish	4	2,262	3,631	1.61
Unicornfish	1	61	101	1.65
Goatfish	1	90	158	1.75
Barracuda	1	20	35	1.75
Dolphin (mahimahi)	22	2,072	3,057	1.48
Rainbow runner	1	142	249	1.75
Wahoo	3	94	117	1.24
Skipjack tuna	115	19,506	24,216	1.24
Dogtooth tuna	1	100	175	1.75
Yellowfin tuna	7	526	764	1.45
Lobster	5	37	158	4.27
** SUBTOTAL **	301	45,693	67,116	

Table III.1.3

CNMI February 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	2	144	252	1.75
Bottom fish	39	3,988	7,121	1.79
Grouper	2	168	398	2.37
Onaga (red snapper)	2	244	1,342	5.50
Opakapaka (pink snp)	1	70	140	2.00
Reef fish	99	18,533	29,683	1.60
Rabbitfish (hitting)	41	1,640	3,006	1.83
Emperor (mafute)	2	60	105	1.75
Parrotfish	4	1,388	2,221	1.60
Surgeonfish	4	2,428	3,885	1.60
Dolphin (mahimahi)	16	1,268	1,788	1.41
Wahoo	4	327	477	1.46
Skipjack tuna	73	12,726	16,598	1.30
Dogtooth tuna	2	111	140	1.27
Yellowfin tuna	3	203	284	1.40
Lobster	6	81	262	3.24
** SUBTOTAL **	300	43,542	67,983	

Table III.1.4

CNMI March 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	2	264	462	1.75
Bottom fish	43	2,702	4,995	1.85
Onaga (red snapper)	3	138	801	5.80
Reef fish	111	19,925	32,107	1.61
Rabbitfish (hitting)	43	684	1,376	2.01
Emperor (mafute)	3	184	322	1.75
Parrotfish	2	1,254	2,006	1.60
Surgeonfish	3	1,572	2,515	1.60
Unicornfish	1	339	542	1.60
Troll fish	1	249	398	1.60
Barracuda	1	21	26	1.25
Dolphin (mahimahi)	22	1,529	2,200	1.44
Wahoo	8	292	452	1.55
Skipjack tuna	147	24,013	32,254	1.34
Dogtooth tuna	3	350	553	1.58
Yellowfin tuna	8	280	376	1.34
Lobster	9	137	467	3.41
** SUBTOTAL **	410	53,933	81,854	

Table III.1.5

CNMI April 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	1	79	190	2.40
Bottom fish	25	581	1,017	1.75
Onaga (red snapper)	1	52	286	5.50
Reef fish	86	20,721	32,460	1.57
Rabbitfish (hitting)	25	263	553	2.10
Emperor (mafute)	1	110	193	1.75
Parrotfish	2	1,268	1,839	1.45
Surgeonfish	1	673	976	1.45
Dolphin (mahimahi)	7	334	545	1.63
Wahoo	1	37	46	1.25
Skipjack tuna	106	18,468	22,287	1.21
Dogtooth tuna	3	189	331	1.75
Yellowfin tuna	6	1,542	2,826	1.83
Lobster	8	144	521	3.61
Octopus	1	21	58	2.75
** SUBTOTAL **	274	44,482	64,124	

Table III.1.6

CNMI May 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	6	907	1,612	1.78
Bottom fish	6	360	635	1.76
Gindai (flower snap)	5	449	882	1.96
Onaga (red snapper)	7	465	1,097	2.36
Opakapaka (pink snp)	4	186	399	2.14
Reef fish	86	17,417	27,250	1.56
Rabbitfish (hitting)	23	255	544	2.13
Emperor (mafute)	10	228	394	1.73
Parrotfish	4	2,546	3,564	1.40
Surgeonfish	1	782	1,095	1.40
Goatfish	2	1,289	1,798	1.40
Dolphin (mahimahi)	11	368	628	1.71
Marlin	7	1,001	1,141	1.14
Wahoo	4	146	250	1.71
Skipjack tuna	145	32,895	39,993	1.22
Dogtooth tuna	4	428	732	1.71
Yellowfin tuna	11	906	1,520	1.68
Lobster	13	251	928	3.70
** SUBTOTAL **	349	60,879	84,461	

Table III.1.7

CNMI June 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	45	4,719	9,163	1.94
Mullet	2	227	248	1.09
Bottom fish	10	320	545	1.70
Gindai (flower snap)	6	332	655	1.97
Grouper	2	45	79	1.75
Onaga (red snapper)	5	344	1,257	3.65
Opakapaka (pink snp)	1	62	109	1.75
Reef fish	77	15,877	24,811	1.56
Rabbitfish (hitting)	9	854	1,398	1.64
Emperor (mafute)	11	744	1,377	1.85
Parrotfish	5	1,742	2,777	1.59
Surgeonfish	3	770	1,218	1.58
Goatfish	1	212	424	2.00
Barracuda	1	81	101	1.25
Marlin	3	281	361	1.29
Wahoo	5	94	138	1.47
Skipjack tuna	115	23,221	28,775	1.24
Dogtooth tuna	8	379	545	1.44
Yellowfin tuna	11	1,125	1,952	1.74
Lobster	28	887	2,288	2.58
** SUBTOTAL **	348	52,316	78,221	

Table III.1.8

CNMI July 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	12	748	1,449	1.94
Bottom fish	12	302	529	1.75
Gindai (flower snap)	1	24	42	1.75
Grouper	2	75	179	2.38
Onaga (red snapper)	3	171	856	5.01
Opakapaka (pink snp)	3	81	178	2.19
Reef fish	92	25,345	39,051	1.54
Rabbitfish (hitting)	9	168	376	2.24
Emperor (mafute)	12	787	1,655	2.10
Parrotfish	9	1,101	2,003	1.82
Marlin	5	787	950	1.21
Skipjack tuna	110	19,229	23,727	1.23
Dogtooth tuna	7	693	1,153	1.66
Yellowfin tuna	10	1,393	1,844	1.32
Lobster	23	684	2,425	3.55
** SUBTOTAL **	310	51,588	76,415	

Table III.1.9

CNMI August 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	2	172	336	1.95
Bottom fish	9	799	1,871	2.34
Onaga (red snapper)	1	23	115	5.00
Opakapaka (pink snp)	1	31	78	2.50
Reef fish	34	6,404	9,978	1.56
Rabbitfish (hitting)	7	171	359	2.10
Rudderfish (guilli)	3	204	446	2.19
Emperor (mafute)	1	50	88	1.75
Parrotfish	4	1,340	2,154	1.61
Surgeonfish	2	586	938	1.60
Marlin	4	697	728	1.04
Skipjack tuna	85	16,937	21,156	1.25
Yellowfin tuna	1	115	201	1.75
Lobster	15	407	1,200	2.95
** SUBTOTAL **	169	27,936	39,645	

Table III.1.10

CNMI September 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	11	2,277	5,118	2.25
Bottom fish	16	911	1,665	1.83
Onaga (red snapper)	5	173	930	5.37
Reef fish	67	15,680	23,957	1.53
Rabbitfish (hitting)	10	118	261	2.21
Emperor (mafute)	21	598	1,094	1.83
Parrotfish	7	942	1,969	2.09
Surgeonfish	3	645	1,035	1.61
Unicornfish	1	398	637	1.60
Marlin	3	469	821	1.75
Wahoo	1	21	28	1.35
Skipjack tuna	91	12,986	16,449	1.27
Dogtooth tuna	1	152	266	1.75
Yellowfin tuna	8	808	1,749	2.16
Lobster	23	624	2,199	3.52
** SUBTOTAL **	268	36,802	58,179	

Table III.1.11

CNMI October 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	6	598	1,199	2.00
Bottom fish	6	374	682	1.82
Reef fish	83	18,814	28,955	1.54
Wrasse	1	13	23	1.75
Rabbitfish (hitting)	19	553	1,204	2.18
Rudderfish (guilli)	4	256	576	2.25
Emperor (mafute)	5	231	466	2.02
Parrotfish	4	571	954	1.67
Surgeonfish	3	458	775	1.69
Barracuda	1	15	26	1.75
Marlin	4	422	664	1.57
Wahoo	1	30	60	2.00
Skipjack tuna	75	9,050	11,981	1.32
Dogtooth tuna	3	143	250	1.75
Yellowfin tuna	1	131	177	1.35
Lobster	30	759	2,803	3.69
** SUBTOTAL **	246	32,418	50,795	

Table III.1.12

CNMI November 1989 Commercial Landings

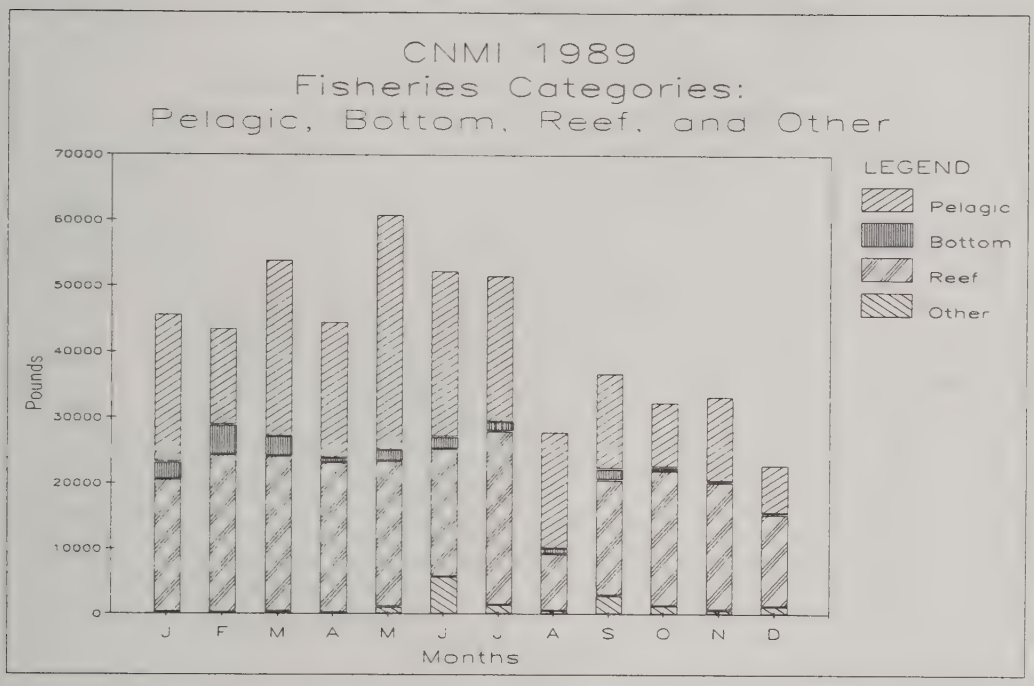
Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	3	370	740	2.00
Mullet	1	50	88	1.75
Bottom fish	1	194	330	1.70
Reef fish	76	18,007	27,548	1.53
Rabbitfish (hitting)	23	567	1,167	2.06
Emperor (mafute)	2	41	76	1.86
Parrotfish	5	807	1,425	1.77
Surgeonfish	1	238	381	1.60
Dolphin (mahimahi)	4	139	197	1.41
Marlin	4	515	736	1.43
Wahoo	4	95	181	1.91
Skipjack tuna	97	10,740	15,079	1.40
Dogtooth tuna	6	429	755	1.76
Yellowfin tuna	6	858	1,571	1.83
Lobster	10	262	917	3.50
** SUBTOTAL **	243	33,312	51,189	

Table III.1.13

CNMI December 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Assorted	1	90	153	1.70
Bigeye scad (atulai)	14	1,083	2,258	2.08
Bottom fish	3	175	299	1.71
Onaga (red snapper)	2	38	190	5.00
Reef fish	55	12,506	19,162	1.53
Rabbitfish (hitting)	26	1,015	2,085	2.05
Rudderfish (guilli)	2	286	518	1.81
Emperor (mafute)	1	9	23	2.50
Surgeonfish	1	306	490	1.60
Unicornfish	1	25	44	1.75
Dolphin (mahimahi)	5	146	275	1.88
Marlin	1	391	684	1.75
Wahoo	3	121	211	1.75
Skipjack tuna	63	6,391	10,390	1.63
Yellowfin tuna	1	200	500	2.50
Lobster	5	85	298	3.50
Octopus	2	35	57	1.62
** SUBTOTAL **	186	22,902	37,636	
** TOTAL **	3,404	505,803	757,618	

Figure III.1.1



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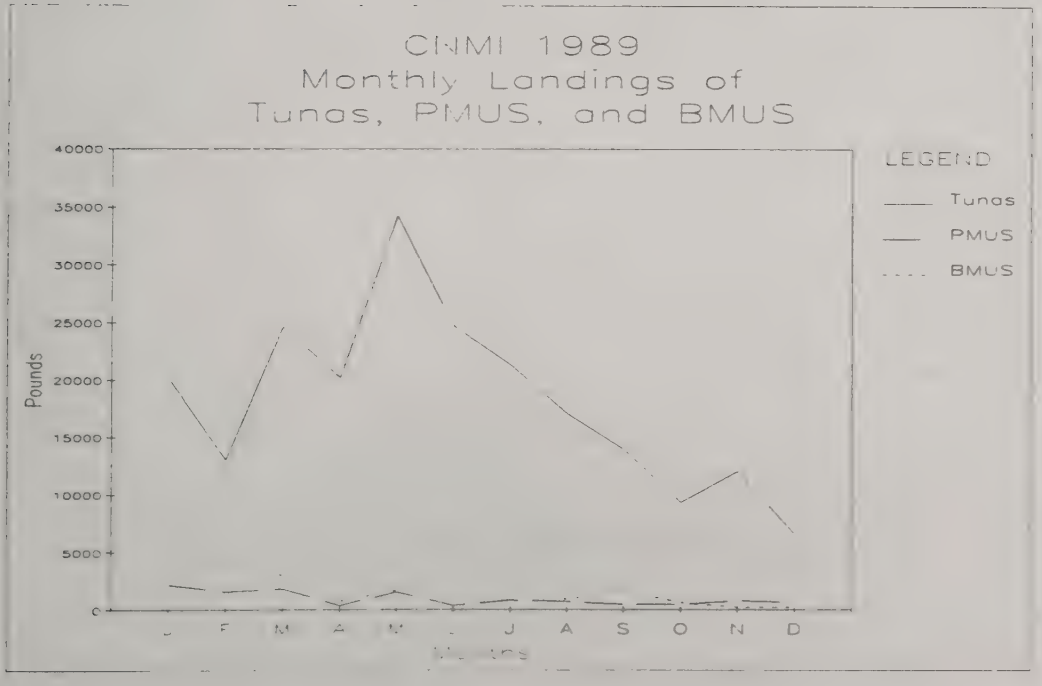

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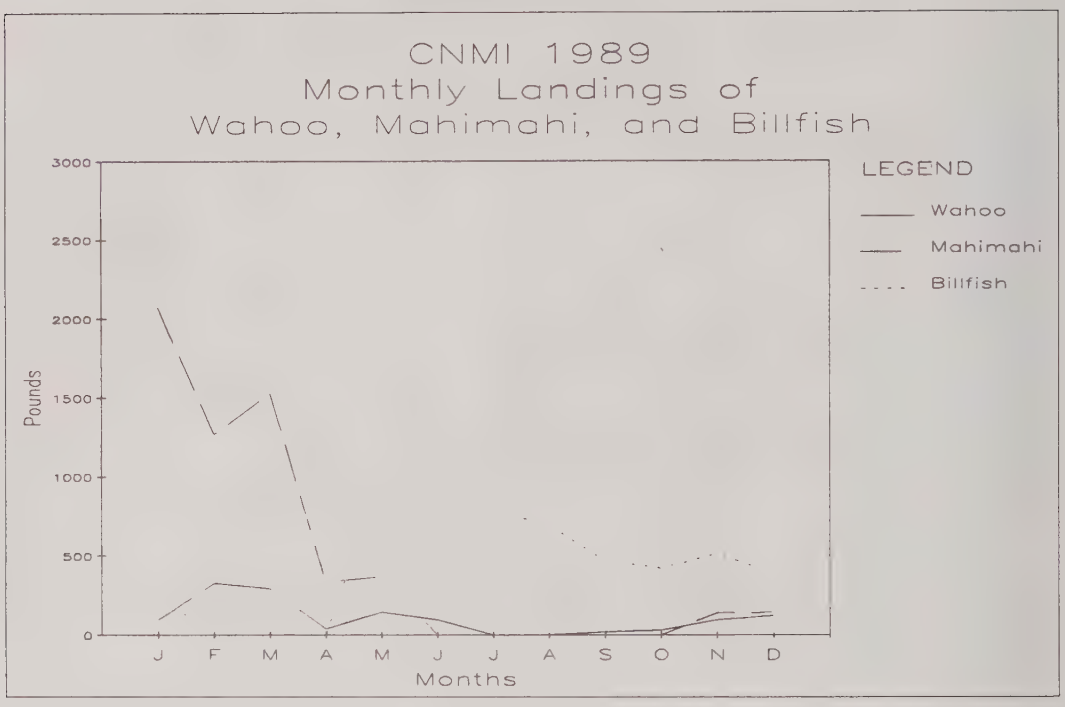

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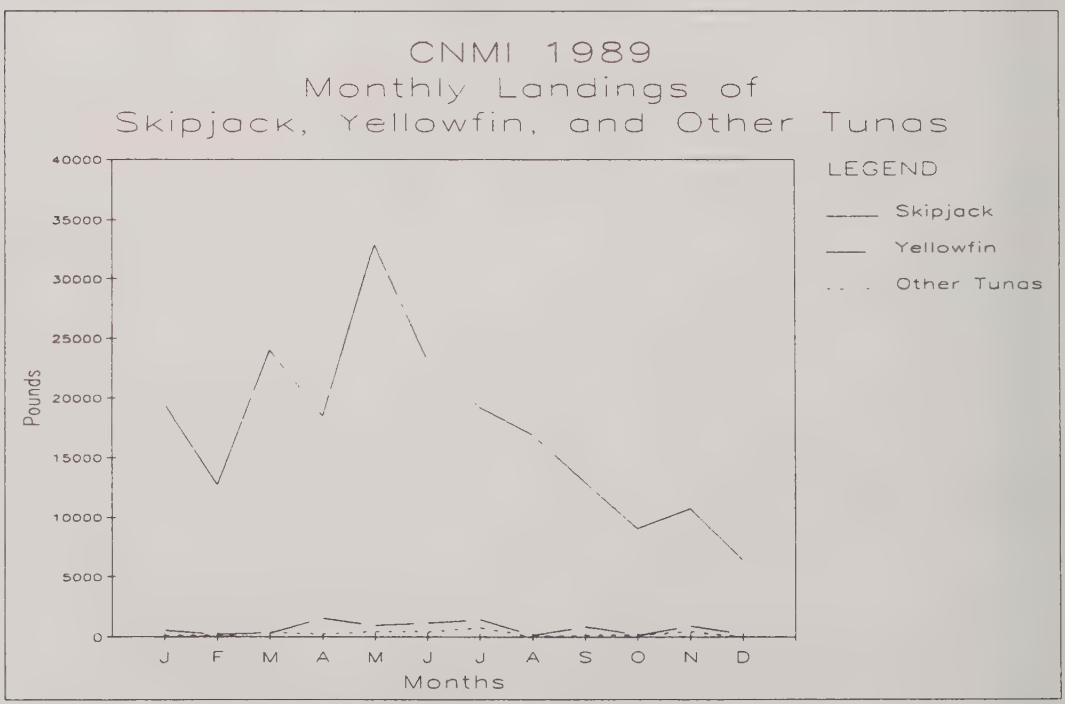

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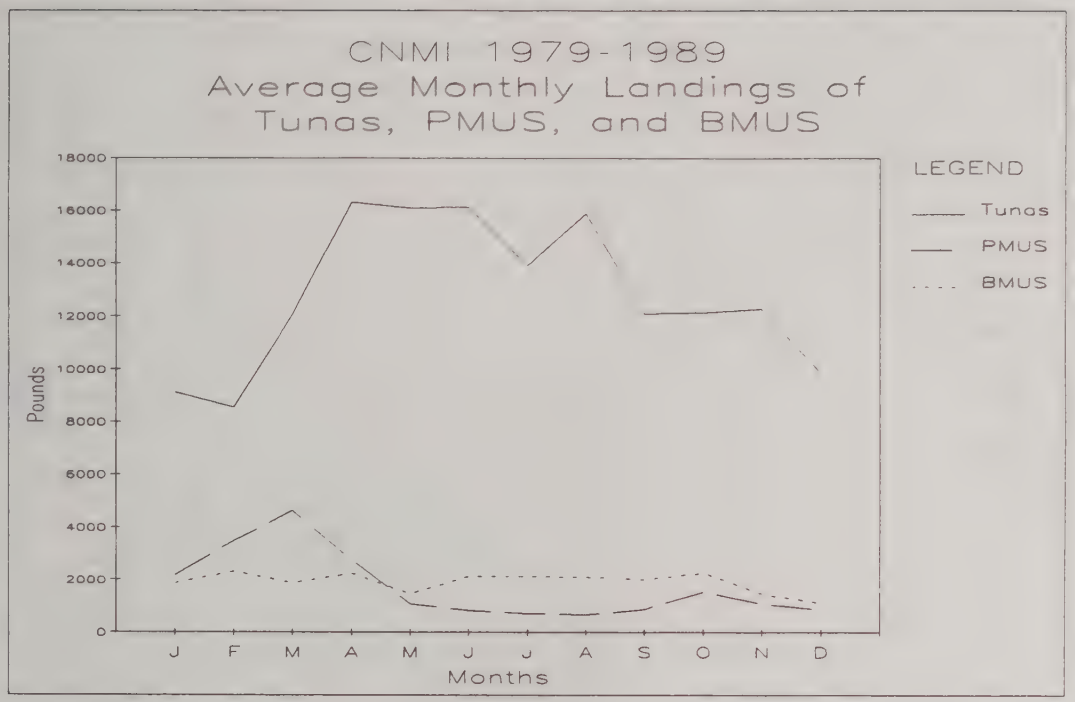

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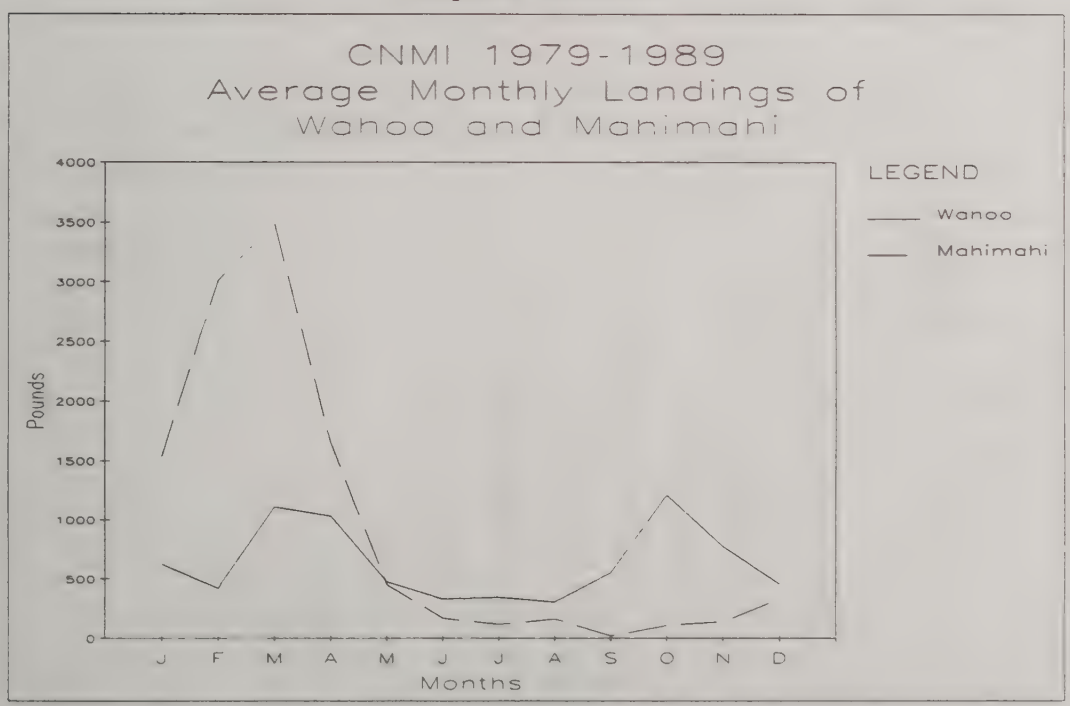

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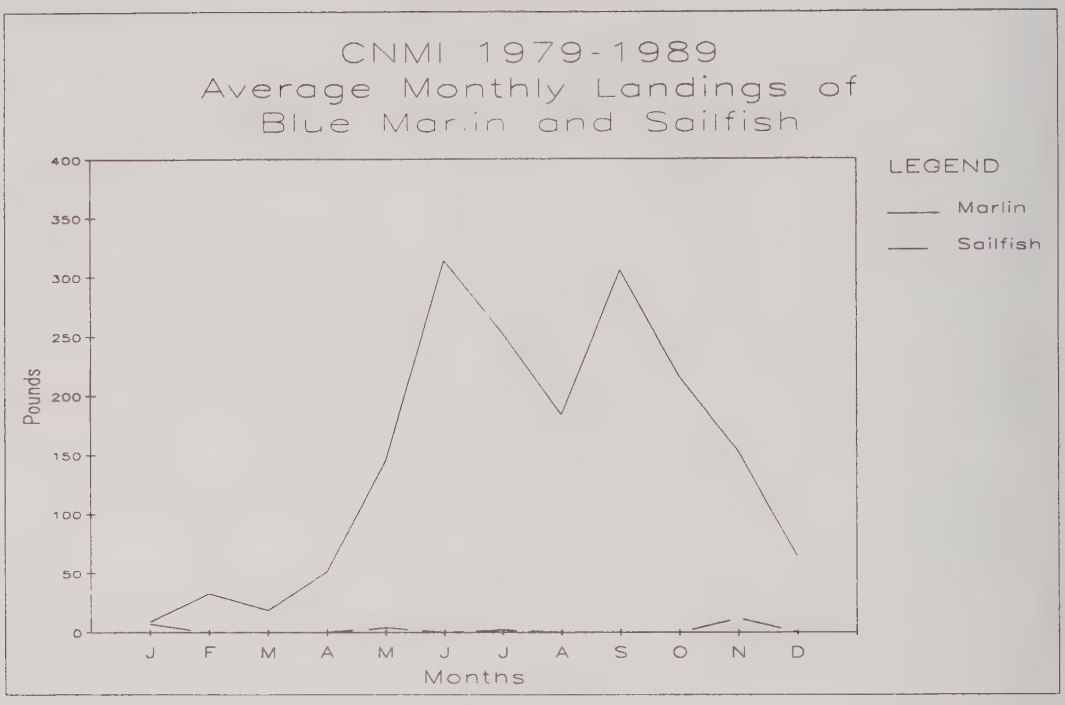

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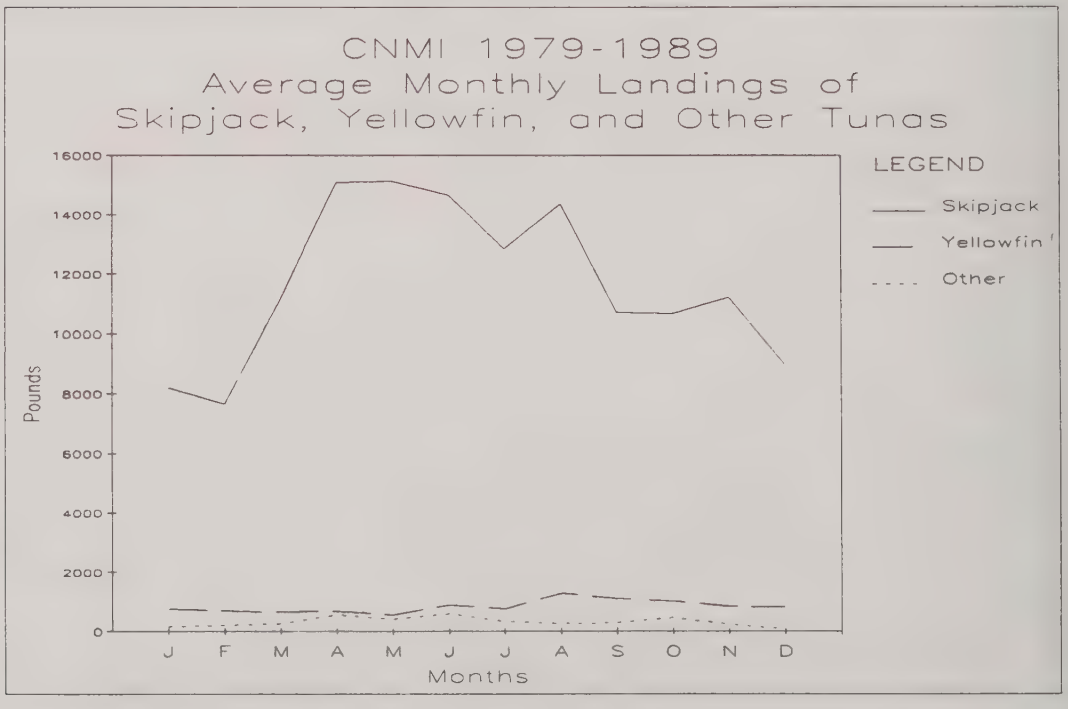

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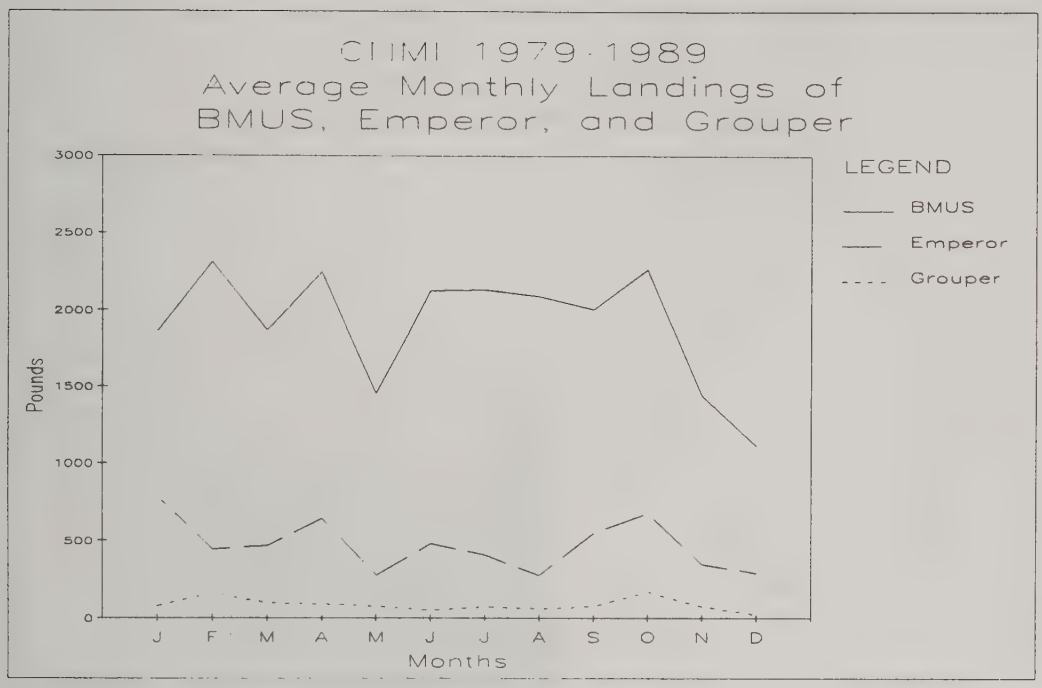

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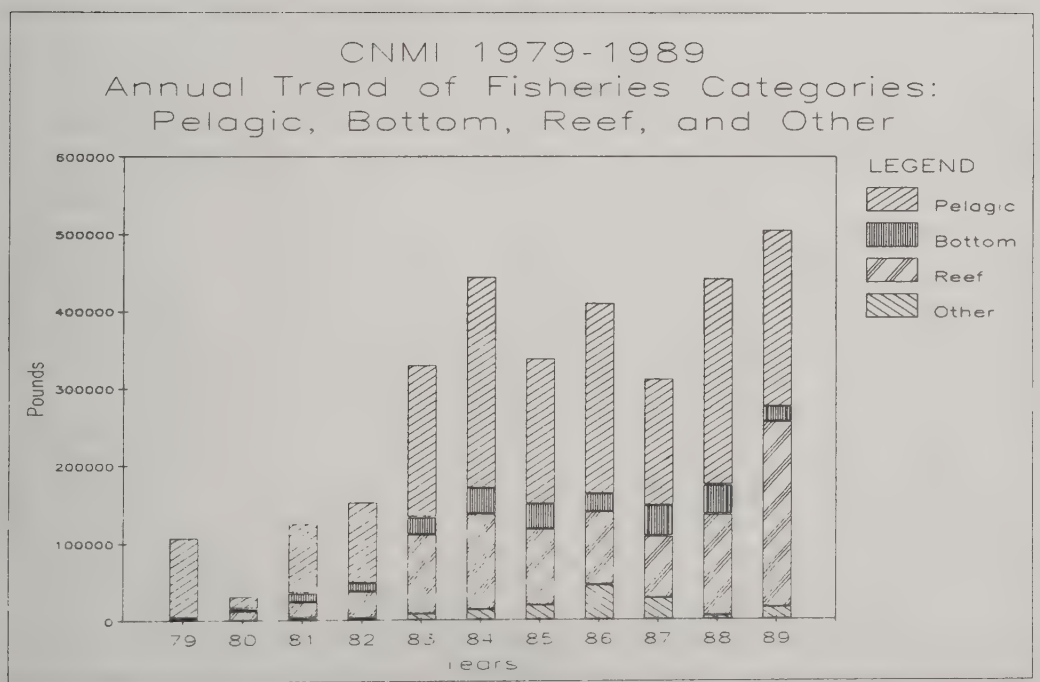

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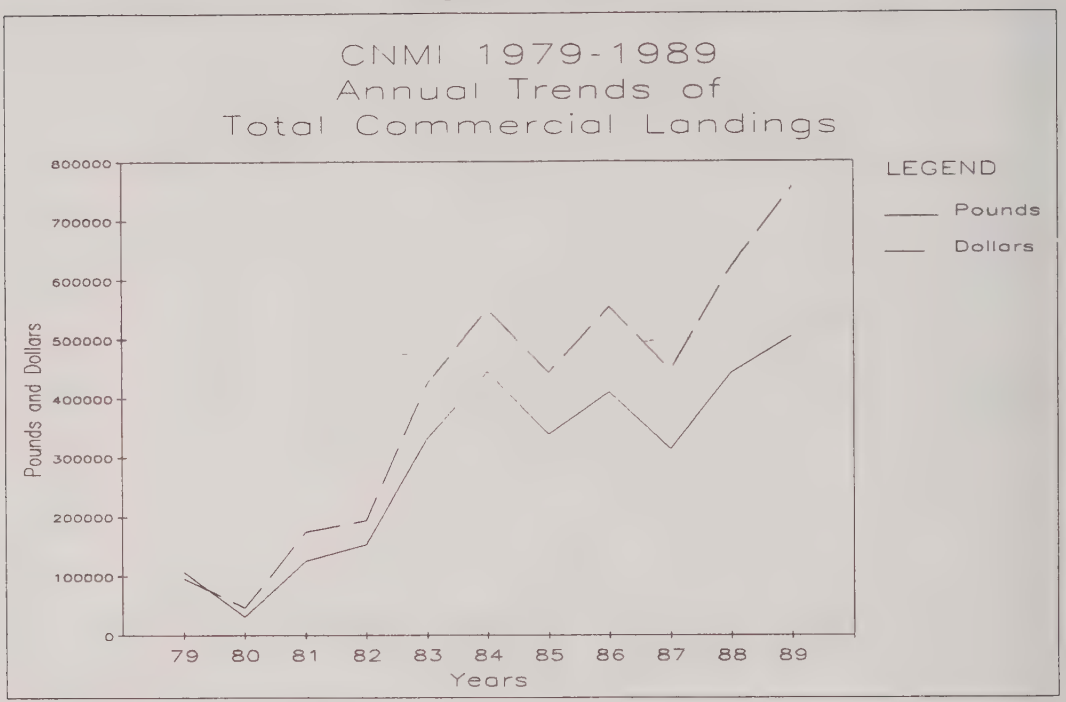

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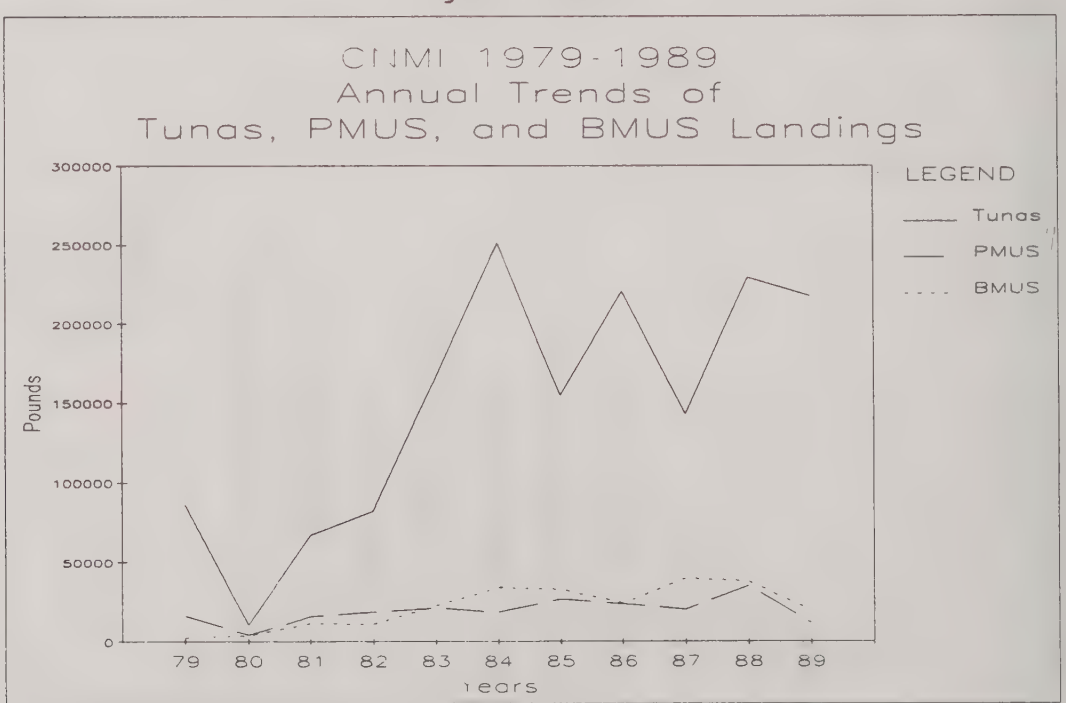

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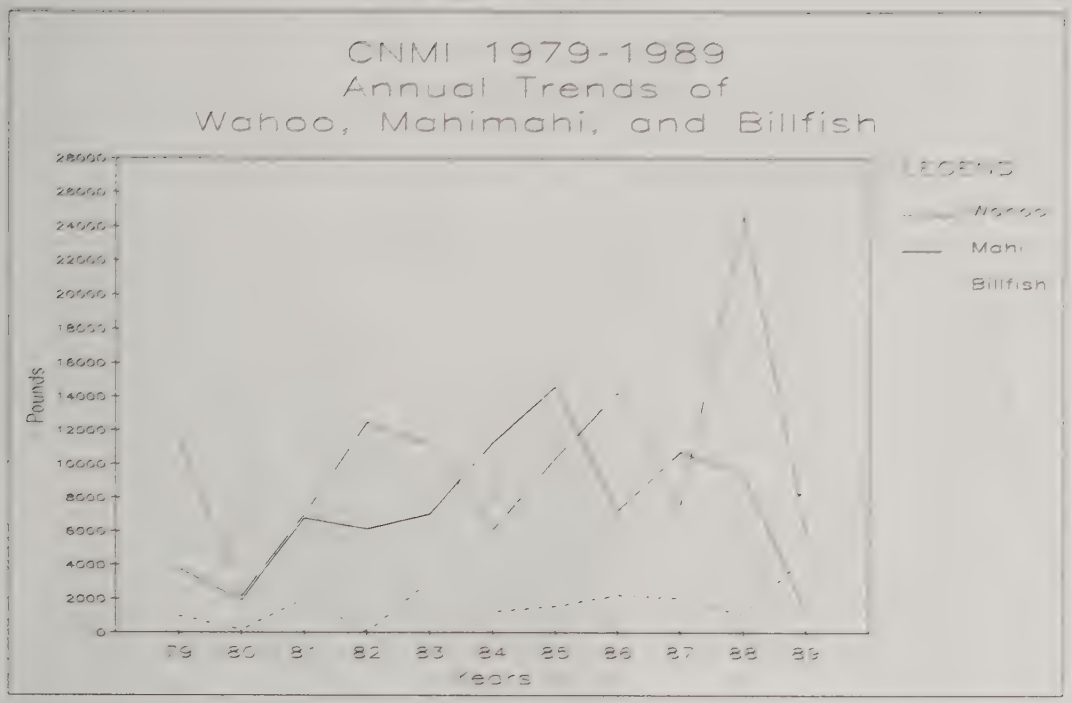

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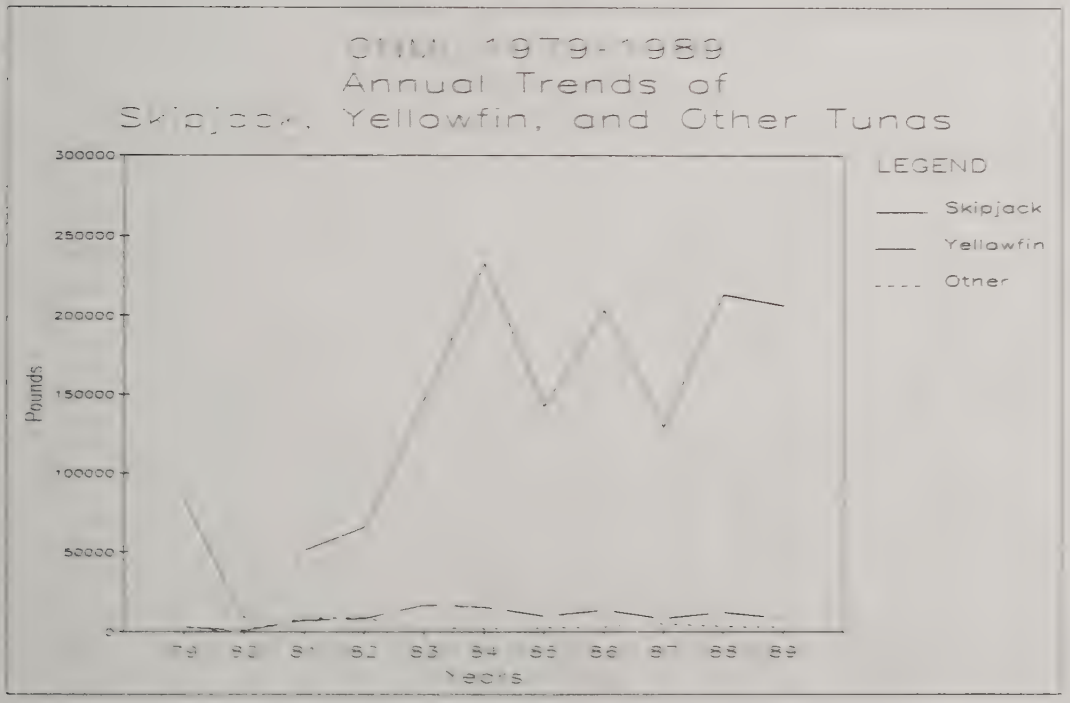

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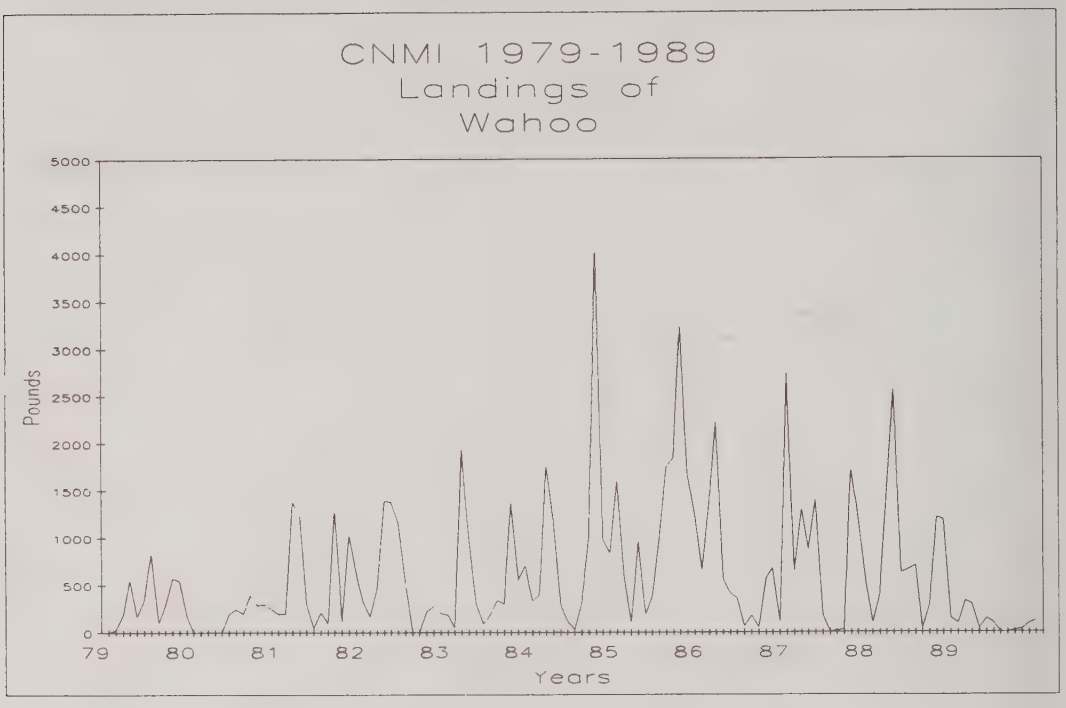

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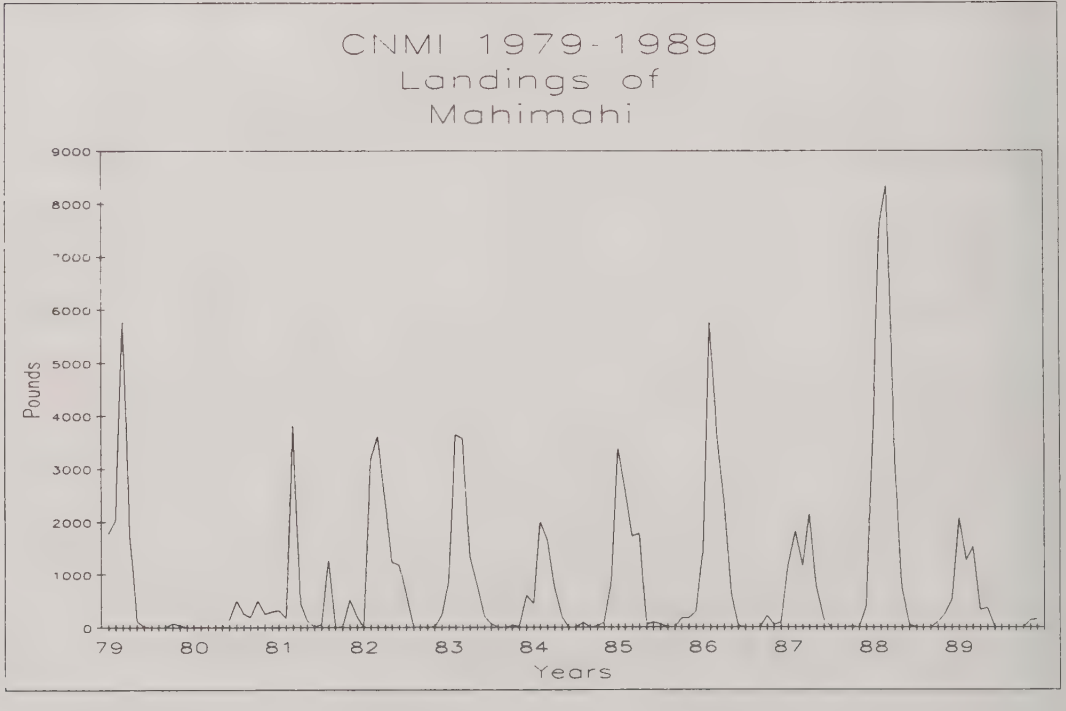

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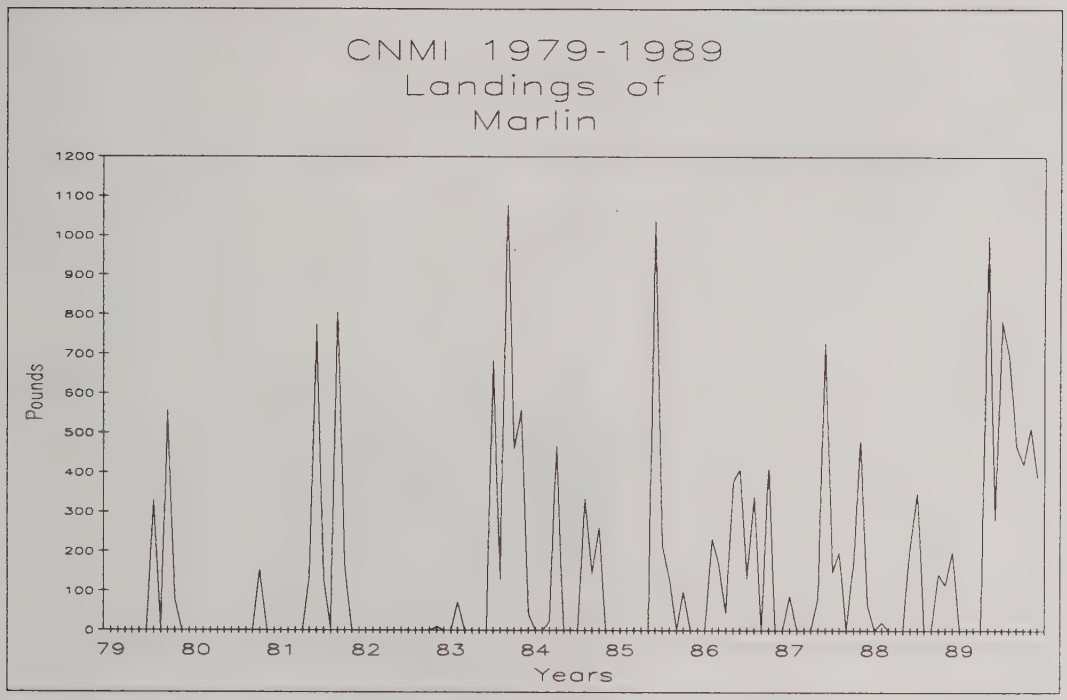

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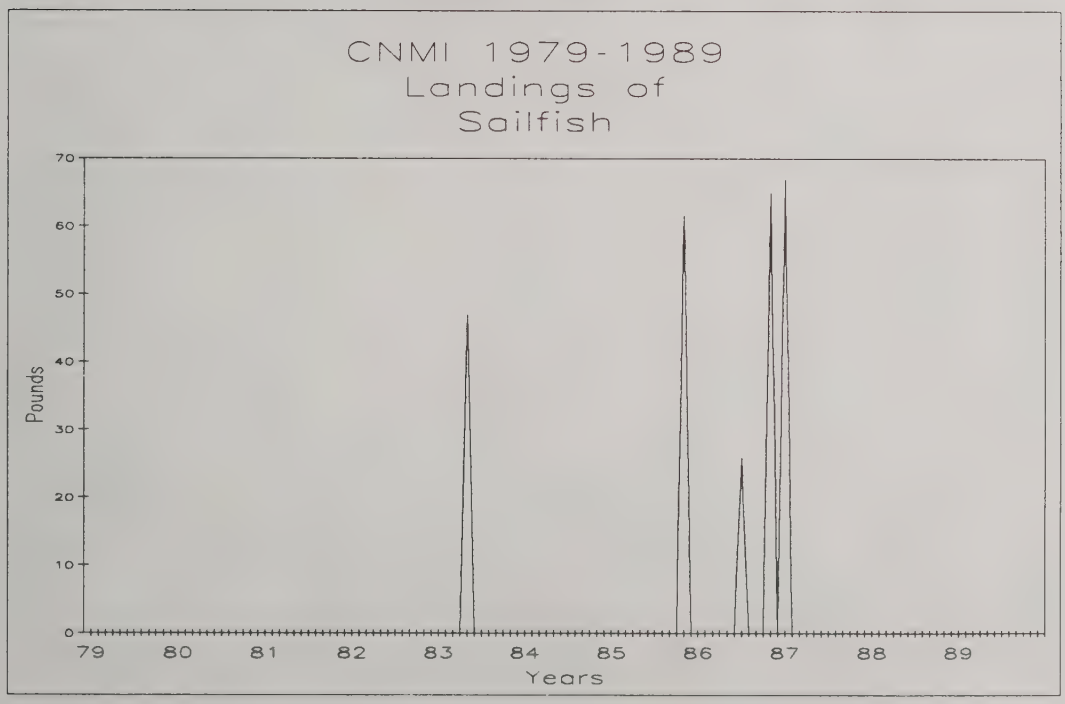

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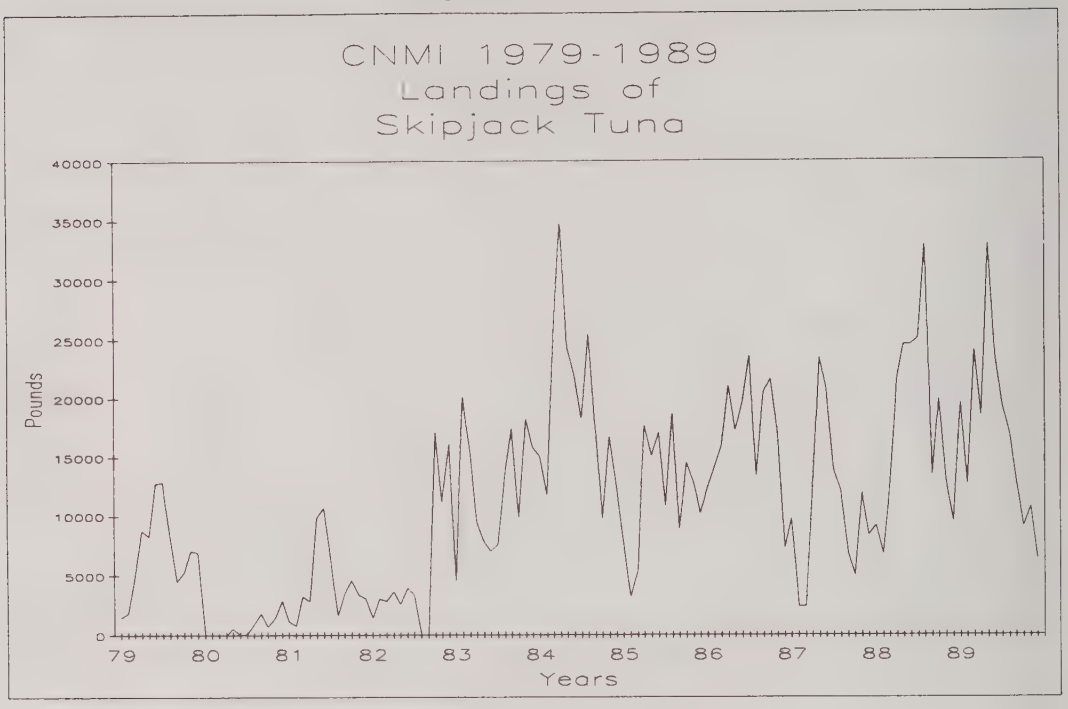

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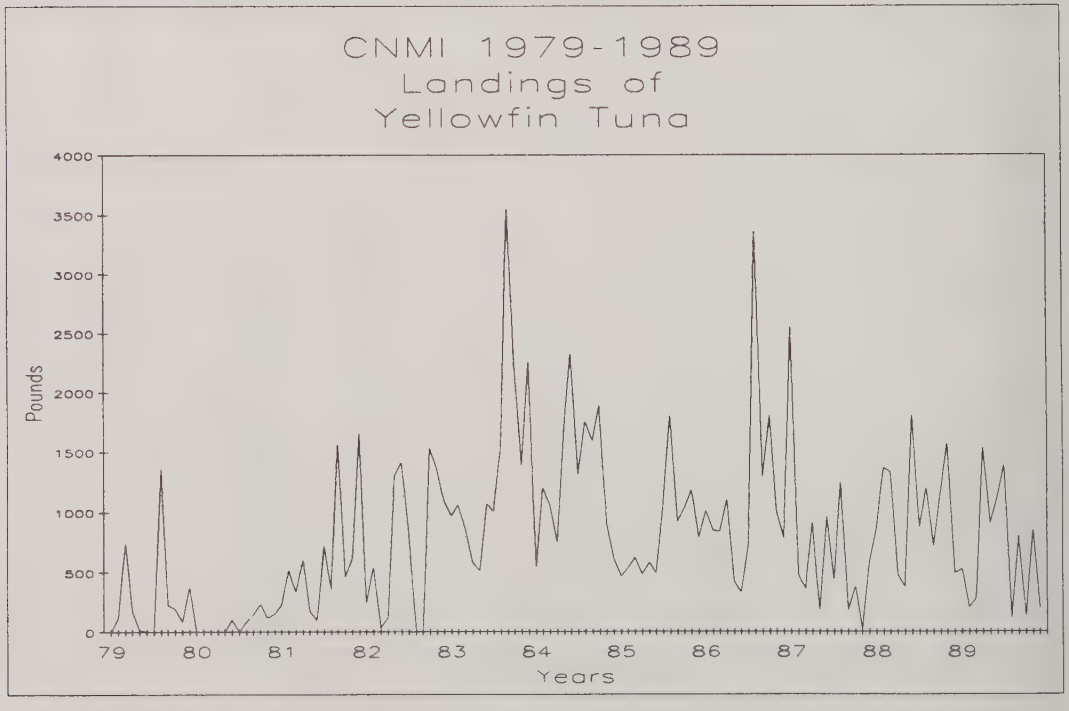

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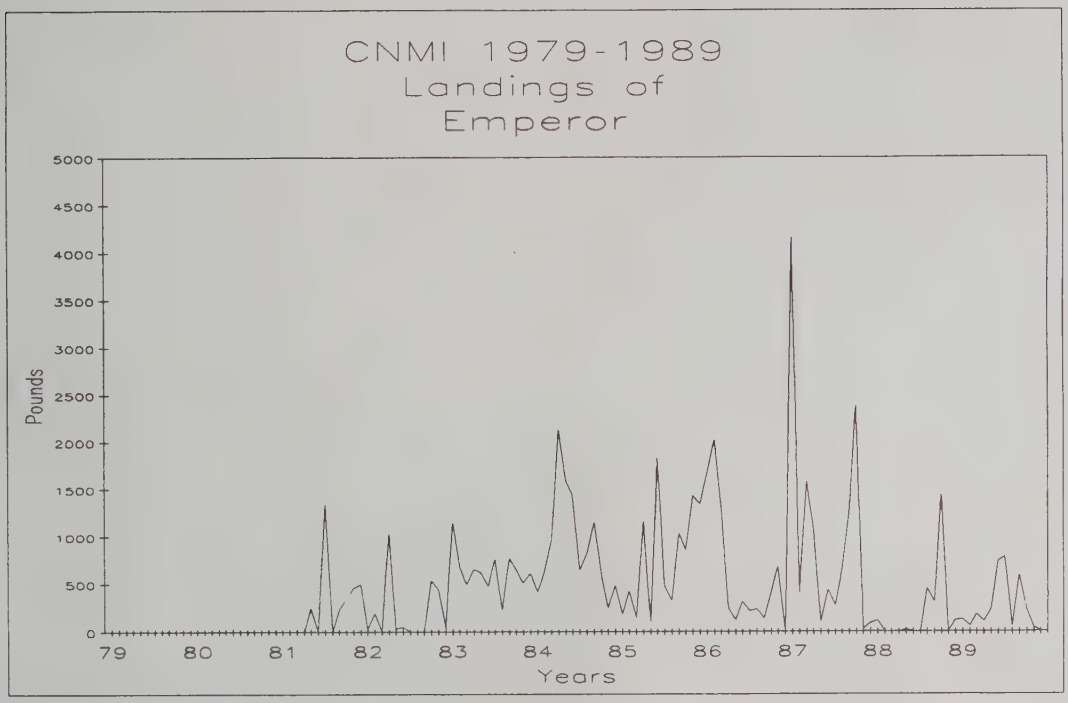

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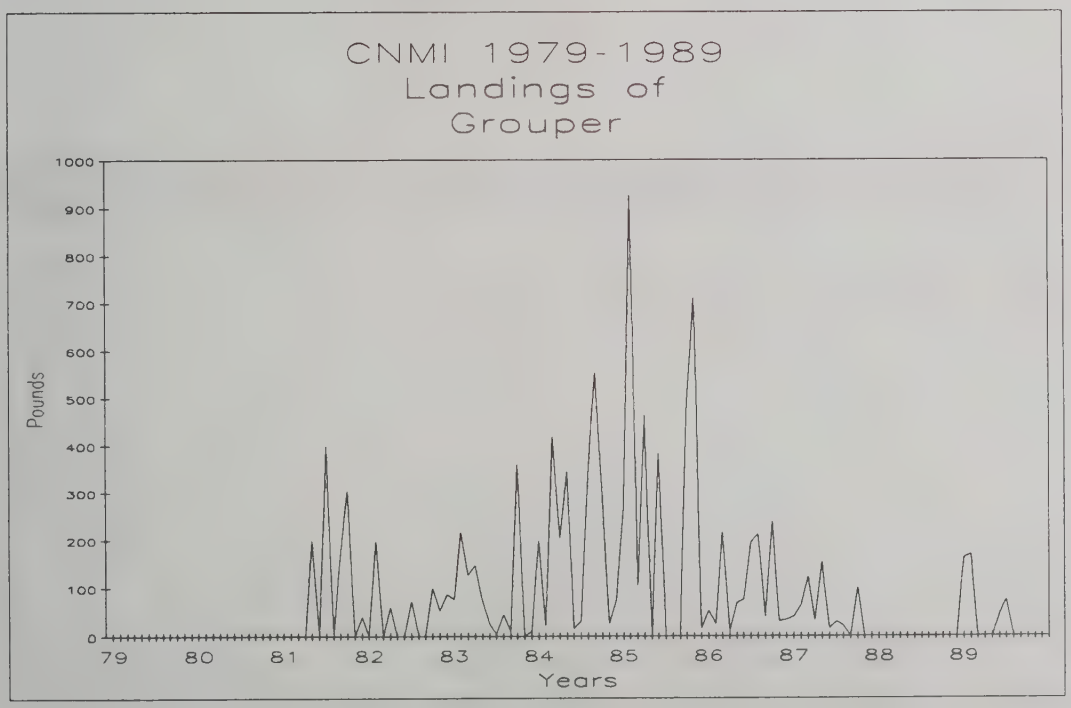


Territory of Guam

Fishery Statistics 1989

GUAM 1989 FISHERY STATISTICS

Compiled by

Guam Division of Aquatic and Wildlife Resources

and the

Western Pacific Fishery Information Network

January 1991

CONTENTS

	Page
Introduction	IV.1
Data Collecting System	IV.1
Commercial Landings	IV.1
Creel Surveys	IV.2
Offshore Creel Survey	IV.3
Inshore Creel Survey	IV.5
Data Processing System	IV.7
Commercial Landings	IV.7
Creel Surveys	IV.7
Data Reporting System	IV.9
Commercial Landings	IV.9
Creel Surveys	IV.11
Interpretation of Statistics	IV.13
Tables and Figures	IV.15

LIST OF GUAM SUMMARY TABLES

Table	Title	Page
IV.1.1	Guam 1989 Annual Commercial Landings	IV.15
IV.1.2	Guam January 1989 Commercial Landings	IV.16
IV.1.3	Guam February 1989 Commercial Landings	IV.16
IV.1.4	Guam March 1989 Commercial Landings	IV.17
IV.1.5	Guam April 1989 Commercial Landings	IV.18
IV.1.6	Guam May 1989 Commercial Landings	IV.19
IV.1.7	Guam June 1989 Commercial Landings	IV.19
IV.1.8	Guam July 1989 Commercial Landings	IV.20
IV.1.9	Guam August 1989 Commercial Landings	IV.21
IV.1.10	Guam September 1989 Commercial Landings	IV.22
IV.1.11	Guam October 1989 Commercial Landings	IV.23
IV.1.12	Guam November 1989 Commercial Landings	IV.24
IV.1.13	Guam December 1989 Commercial Landings	IV.25
IV.2.1	Guam DAWR Annual 1989 Offshore Creel Survey Expansion Summary	IV.38
IV.2.2	Guam DAWR Annual 1989 Offshore Creel Survey Species Composition	IV.38
IV.3.1	Guam DAWR January 1989 Offshore Creel Survey Expansion Summary	IV.40
IV.3.2	Guam DAWR February 1989 Offshore Creel Survey Expansion Summary	IV.40
IV.3.3	Guam DAWR March 1989 Offshore Creel Survey Expansion Summary	IV.40
IV.3.4	Guam DAWR April 1989 Offshore Creel Survey Expansion Summary	IV.41
IV.3.5	Guam DAWR May 1989 Offshore Creel Survey Expansion Summary	IV.41
IV.3.6	Guam DAWR June 1989 Offshore Creel Survey Expansion Summary	IV.41
IV.3.7	Guam DAWR July 1989 Offshore Creel Survey Expansion Summary	IV.42
IV.3.8	Guam DAWR August 1989 Offshore Creel Survey Expansion Summary	IV.42
IV.3.9	Guam DAWR September 1989 Offshore Creel Survey Expansion Summary	IV.42
IV.3.10	Guam DAWR October 1989 Offshore Creel Survey Expansion Summary	IV.43
IV.3.11	Guam DAWR November 1989 Offshore Creel Survey Expansion Summary	IV.43
IV.3.12	Guam DAWR December 1989 Offshore Creel Survey Expansion Summary	IV.43
IV.4.1	Guam DAWR January 1989 Offshore Creel Survey Species Composition	IV.44
IV.4.2	Guam DAWR February 1989 Offshore Creel Survey Species Composition	IV.45

LIST OF GUAM SUMMARY TABLES (cont.)

Table	Title	Page
IV.4.3	Guam DAWR March 1989 Offshore Creel Survey Species Composition	IV.46
IV.4.4	Guam DAWR April 1989 Offshore Creel Survey Species Composition	IV.47
IV.4.5	Guam DAWR May 1989 Offshore Creel Survey Species Composition	IV.48
IV.4.6	Guam DAWR June 1989 Offshore Creel Survey Species Composition	IV.49
IV.4.7	Guam DAWR July 1989 Offshore Creel Survey Species Composition	IV.50
IV.4.8	Guam DAWR August 1989 Offshore Creel Survey Species Composition	IV.51
IV.4.9	Guam DAWR September 1989 Offshore Creel Survey Species Composition	IV.52
IV.4.10	Guam DAWR October 1989 Offshore Creel Survey Species Composition	IV.53
IV.4.11	Guam DAWR November 1989 Offshore Creel Survey Species Composition	IV.54
IV.4.12	Guam DAWR December 1989 Offshore Creel Survey Species Composition	IV.55
IV.5.1	1989 Guam International Fishing Derby Summary Reports	IV.56
IV.6.1	Guam DAWR Annual 1989 Day Inshore Creel Survey Expansion Summary	IV.57
IV.6.2	Guam DAWR Annual 1989 Night Inshore Creel Survey Expansion Summary	IV.57
IV.7.1	Guam DAWR Annual 1989 Day Inshore Creel Survey Species Composition	IV.58
IV.7.2	Guam DAWR Annual 1989 Night Inshore Creel Survey Species Composition	IV.59
IV.7.3	Guam DAWR Annual 1989 Combined Day and Night Inshore Creel Survey Species Composition	IV.60
IV.7.4	Guam DAWR Annual 1989 Combined Offshore and Inshore Creel Survey Species Composition	IV.61

LIST OF GUAM FIGURES

Table	Title	Page
IV.1.1	Guam 1989 Fisheries Categories: Pelagic, Bottom, Reef, and Other	IV.26
IV.1.2	Guam 1989 Monthly Landings of Tunas, PMUS, and BMUS	IV.26
IV.1.3	Guam 1989 Monthly Landings of Wahoo, Mahimahi, and Billfish	IV.27
IV.1.4	Guam 1989 Monthly Landings of Skipjack, Yellowfin, and Other Tunas	IV.27
IV.2.1	Guam 1979-1989 Average Monthly Landings of Tunas, PMUS, and BMUS	IV.28
IV.2.2	Guam 1979-1989 Average Monthly Landings of Wahoo, and Mahimahi	IV.28
IV.2.3	Guam 1979-1989 Average Monthly Landings of Marlin, Spearfish, and Sailfish	IV.29
IV.2.4	Guam 1979-1989 Average Monthly Landings of Skipjack, Yellowfin, and Other Tunas	IV.29
IV.2.5	Guam 1979-1989 Average Monthly Landings of BMUS, Grouper, and Emperor	IV.30
IV.3.1	Guam 1979-1989 Annual Trend of Fisheries Categories: Pelagic, Bottom, Reef, and Other	IV.30
IV.3.2	Guam 1979-1989 Annual Trends of Total Commercial Landings	IV.31
IV.3.3	Guam 1979-1989 Annual Trends of Tunas, PMUS, and BMUS Landings	IV.31
IV.3.4	Guam 1979-1989 Annual Trends of Wahoo, Mahimahi, and Billfish	IV.32
IV.3.5	Guam 1979-1989 Annual Trends of Skipjack, Yellowfin, and Other Tunas	IV.32
IV.4.1	Guam 1979-1989 Monthly Landings of Wahoo	IV.33
IV.4.2	Guam 1979-1989 Monthly Landings of Mahimahi	IV.33
IV.4.3	Guam 1979-1989 Monthly Landings of Marlin	IV.34
IV.4.4	Guam 1979-1989 Monthly Landings of Sailfish	IV.34
IV.4.5	Guam 1979-1989 Monthly Landings of Spearfish	IV.35
IV.4.6	Guam 1979-1989 Monthly Landings of Skipjack Tuna	IV.35
IV.4.7	Guam 1979-1989 Monthly Landings of Yellowfin Tuna	IV.36
IV.4.8	Guam 1979-1989 Monthly Landings of Emperor	IV.36
IV.4.9	Guam 1979-1989 Monthly Landings of Grouper	IV.37
IV.5.1	Guam 1989 Catch by Method: Troll, Bottom, and Other	IV.62
IV.5.2	Guam 1989 Effort by Method: Troll, Bottom, and Other	IV.62

LIST OF GUAM FIGURES (cont.)

Table	Title	Page
IV.6.1	Guam 1979-1989 Annual Catch by Method: Troll, Bottom, and Other	IV.63
IV.6.2	Guam 1979-1989 Annual Effort by Method: Troll, Bottom, and Other	IV.63
IV.7.1	Guam 1983-1989 Inshore Total Catch and Effort	IV.64
IV.7.2	Guam 1983-1989 Offshore and Inshore Total Catch	IV.64

GUAM 1989 FISHERY STATISTICS

INTRODUCTION

The Territory of Guam (lat. 13.4° N and long. 144.4° E) is the southernmost, largest, and most populous island in the Mariana Archipelago. All of the islands in the chain north of Guam belong to the Commonwealth of the Northern Mariana Islands. Guam is located about 6,000 km (3,700 mi) west-southwest of Honolulu, 2,500 km (1,550 mi) south-southeast of Tokyo, and 2,600 km (1,600 mi) east of Manila. Guam is about 48 km (30 mi) long, varies from 6 to 14 km (4 to 9 mi) wide, and has an estimated land area of 554 km^2 (214 mi^2) and a population of about 120,000.

Fishing activities on Guam can be divided into two basic categories: offshore and inshore fishing. Offshore fishing typically involves small boat (12 to 48 feet), 1 to 2-day trolling and bottom fishing trips that usually originate from one of the three principal harbors located on the west coast and southern tip of the island. Inshore fishing is typically conducted without the use of a boat and consists mostly of nearshore casting, netting, and spearfishing. The Guam Department of Agriculture's Division of Aquatic and Wildlife Resources (DAWR) has been conducting offshore and inshore creel surveys since the early 1970's. Beginning in 1982, DAWR began modifying its data collecting and processing systems to improve estimates of catch and effort by improving sampling techniques and by incorporating the use of microcomputers to expand the survey data. The WPACFIN provided microcomputers and training and worked with DAWR staff and a contractor to redesign the sampling program. In 1982, WPACFIN also began working with local fish wholesalers to obtain information on the commercial landings of Guam. It is from these two sources, DAWR and wholesalers, that the original data for the statistics presented in this report have come.

DATA COLLECTING SYSTEMS

The Guam data collecting systems are divided into two distinctly different systems, one for collecting commercial landings information and one for collecting total landings information through creel surveys.

Commercial Landings

Fish entering the commercial market in Guam come from three sources, full-time commercial fishermen, part-time commercial fishermen, and subsistence or recreational fishermen who frequently sell portions of their catch. No licenses are required to sell fish in Guam, nor are there any reporting requirements for those selling fish. Before 1979, there was no

central place to sell fish, so fishermen had to develop their own markets and peddle their own fish after each trip. The Guam Fishermen's Coop was established, via some government funding, in Agana in July 1979. The Coop subsequently became the central distribution center for fresh local fish. In 1982, WPACFIN began working with the Coop to improve their invoicing system and obtain data on all fish purchases. A cooperative system was established whereby the Coop would use the forms and coding schemes designed by WPACFIN and would supply copies of all invoices to WPACFIN for entering into computer format. In return, WPACFIN would provide the Coop with document quality control and computer generated summary statistics. All purchase data back to July 1979 also were coded and computerized.

Data from two other fish wholesalers were collected beginning in 1983 and continued until early 1987 by which time both had left the business. During 1987, a foreign tuna longline fleet began transshipping fish out of Guam. Excess fish from these boats became available to local buyers and the Coop's business suffered. Because of these and other marketing problems in 1987 and 1988 the recorded commercial purchases made by the Coop declined. Therefore our percent coverage of the total commercial landings declined, and the reported commercial data for 1988 do not reflect the true commercial fisheries as well as previous years. All tables and figures of commercial landings information included in this report are provided with the consent of the Coop wholesalers.

Data collected on commercial forms include

- Date
- Fisherman code
- Number of fishermen
- Hours fished
- Area fished
- Species caught
- Number of pieces caught
- Pounds caught
- Price per pound

Creel Surveys

The DAWR has the responsibility to monitor and protect the wildlife and marine resources of Guam. To this end, it began conducting creel surveys in the early 1970's. By systematic, random interviewing of fishermen, DAWR developed a means of estimating total catch and effort by fishing method for the inshore and offshore fisheries. Sampling methodologies were frequently modified in the early years to incorporate new information and insights gained during the surveys. Aerial surveys were conducted for several years to help improve estimates of percent coverage. The basic survey methodology was fairly well established by 1979. All data processing was done by hand.

In the 1970's, an annual fishing derby was organized on Guam by groups of local fishermen. This 3-day tournament soon became a highly successful event, with much participation by local recreational and commercial fishermen. The DAWR began collecting census information on the Annual Guam International Fishing Derby activities as a means of obtaining additional catch and effort information. Although the significance of these data is minor compared to the creel surveys, summaries of derby results are included in this document as a point of interest.

In 1982, WPACFIN hired a contractor to work with DAWR staff to improve the statistical validity of the creel surveys and to establish mathematical algorithms to expand the sample data to estimate total catch and effort with confidence intervals. Consequently, DAWR further improved its sampling methodologies based on the contractor's recommendations, such as adding surveys to better estimate total participation. The WPACFIN developed computer processing systems to automate the data handling and expansion activities. The system design is flexible enough to allow for continued improvements as additional information, insight, and funding are gained. It is essential for the user to understand the basic sampling design and some of the assumptions made for the offshore and inshore surveys to facilitate proper interpretation of the resultant statistics.

The DAWR's fishermen interviews, also called creel surveys, are divided into two separate, major surveys, offshore and inshore. Both are based on a systematic, random sampling of the fisheries; field sampling and interviews are done on a specific number of randomly selected weekdays and weekend-holidays each month. Both surveys are stratified by weekday and weekend-holiday sampling and, begining in 1988, were conducted on 4 days per month. Both include two subsurveys, one for counting and estimating total participation and one for actually interviewing fishermen for catch and effort information. Both are based on the assumptions that the information given by the fishermen is accurate and the fishermen interviewed are representative of the entire fishing population.

Offshore Creel

Most offshore fishing trips originate from one of three harbors on Guam. Apra Harbor is the largest of these harbors, serves military and commercial shipping activities, and is considered one of the best natural harbors in the western Pacific. It ranks third among the harbors as points of origination for offshore fishing trips. Cocos Lagoon on Guam's southern tip is the second largest protected harbor and ranks second as a launching area for offshore fishing trips. The Agana Boat Basin, centrally located on the west coast of Guam in the capitol of Agana, is the smallest of the three harbors but is the busiest launching area for offshore fishing trips. Therefore, DAWR selected the boat basin as the site for interviewing offshore fishermen.

Concurrent with interviewing fishermen returning from trips at the boat basin, a participation survey is conducted to obtain counts of boating activity for the entire island. For estimating total participation for a survey day, unless contrary information is available, a boat is assumed to be fishing if it is "out," as evidenced by its trailer at a boat ramp or being missing from its normal berthing area. A further assumption is made that the fishing activity and success rate of fishermen originating at the Agana Boat Basin are not statistically different from those of fishermen leaving from other areas on the island. The basic premise of the offshore sampling program is that the combined interviews collected on each survey day are sufficient to estimate the average catch and effort for each fishing method used during that day. Therefore, each survey day represents a measurement of the offshore fisheries. Data collected during the participation portion of the offshore creel survey are limited to boat count by launching area, whereas data collected during interviews include the following:

* Date (year, month, day)
* Type day (weekday or weekend-holiday)
* Fishing method
* Interview time
  Area fished
  Boat number
* Number of fishermen
* Number of gear units
* Hours fished per gear
  Total count for all species combined
  Type total count
* Total weight for all species combined
  Type total weight
  Total number of species
  Type total number of species
Total count for each species
  Type count for each species
Total weight for each species
  Type total weight for each species
Species name (or species group)
  Length for an individual fish
  Type individual length
  Weight for an individual fish
  Type individual weight
  Bait used (up to three different types)
  Wind direction and speed
  Weather conditions
  Cloud cover
  Lunar day
  Percent of catch kept
  Percent of catch sold to the Coop
  Percent of catch sold elsewhere

It is not always possible for the interviewer to obtain information on all items listed. However, those marked with an

asterisk (*) are essential to the data expansion process for estimating total catch and effort. Those marked with a pound or number sign (#) are essential to estimating the percent species composition of the catch. The "type" elements (e.g., type individual length) identify the kind of measurements, i.e., either actual, estimated, or calculated.

Inshore Creel Survey

Fielding the inshore creel survey is considerably more complex and troublesome than the offshore survey for several reasons. For instance, fishing activities originate from and occur over a large portion of the coastline, making participation counts and fishermen interviews much more difficult to obtain. Additionally, it is more difficult to obtain interviews for completed fishing trips because the interviewer must survey many miles of coastline where fishermen may quickly terminate their activities at any time. The turnover rate of fishermen during the sampling period is a difficult factor for which to adjust. Tidal stage and moon phase also influence inshore fishing much more than offshore fishing. Nighttime and seasonal pulse fishing are also major considerations for the inshore fisheries. In October 1984, DAWR began additional survey efforts to help quantify the nighttime and seasonal inshore fisheries.

Notwithstanding these complexities and problems, the basic designs of the offshore and inshore surveys are very similar in that they both have participation counts and creel interviews. Two of the significant differences between the offshore and inshore surveys are that the inshore participation counts are made by fishing method as well as by location, and that interview information is combined to form averages of catch and effort for a much larger time period (month, quarter, year) than a single day as in the offshore survey. Therefore, daily measurements of the inshore fisheries are based on island-wide participation counts for a survey day by using averages for the catch information based on user-specified, flexible time periods, typically quarterly and annual averages. This modification of the expansion algorithm was required for DAWR to physically complete an inshore survey with limited manpower. Participation counts for essentially the entire island can be obtained during a single sample day, but adequate creel interviews for all methods for the entire island cannot be obtained with the manpower available. Additionally, the surveyable portions of the coastline are divided into three regions to facilitate statistically sound sampling of fishermen. Data for the day and night surveys are processed and expanded separately. Data on the seasonal fisheries for juvenile rabbitfish and bigeye scad are collected at irregular intervals when the fisheries are active. Information collected during the inshore participation surveys includes

* Date (year, month, day)
* Type day (weekday or weekend-holiday)
* Location fished
  Time sighted
* Method used
* Number of persons
* Number of gear units
  Reef zone fished
  Weather and water conditions
  Tidal stage

Information collected during the inshore interviews includes

* Date (year, month, day)
* Type day (weekday or weekend-holiday)
* Fishing method
* Interview time
* Location
  Reef zone fished
* Number of fishermen
* Number of gear units
* Actual hours fished per gear
* Estimated trip time
  Total count for all species combined
  Type total count
* Total weight for all species combined
  Type total weight
  Total number of species
Total count for each species
  Type count for each species
Total weight for each species
  Type total weight for each species
Species name (or species group)
  Length for an individual fish
  Type individual length
  Weight for an individual fish
  Type individual weight
  Bait
  Wind direction
  Wind speed
  Weather conditions
  Cloud cover
  Surf
  Tidal stage
  Swell direction

As in the offshore survey, the interviewer cannot always obtain information on all items listed. Those marked with an asterisk are essential to the data expansion process for estimating total catch and effort. Those marked with a pound or number sign are essential to estimating the percent species composition of the catch. The "type" elements (e.g., type individual length) identify the kind of measurements, i.e., either actual, estimated, or calculated.

DATA PROCESSING SYSTEMS

The Guam data processing systems are divided into two separate and distinctly different systems, one for processing the commercial landings data and one for processing the DAWR creel survey data.

Commercial Landings

The processing system for the commercial landings data collected from the wholesalers is fairly straightforward. A purchase form is completed by the wholesaler each time fish are purchased from a fisherman. Catches are divided into categories for weighing by species or species group, and where practicable, number of pieces is recorded. Preferably, coding and initial quality control of the forms are done by Coop or DAWR personnel before they are shipped to WPACFIN for computer processing; however, these activities must sometimes be done by WPACFIN staff. Data are entered into a computer and loaded into central WPACFIN data bases, where edit reports are generated and used to locate and correct any errors in the data base. Once all edits, verifications, and corrections are made, summary reports are generated. Standard reports available include total monthly and annual landings by species, total landings by fisherman, and landings by fisherman by species. Purchase forms are returned to the wholesalers along with summary reports and graphs for their use.

Creel Surveys

The processing systems for the creel surveys are much more complex than those for the commercial landings data. The basic data handling and processing systems for the inshore and offshore surveys are the same. Data forms completed in the field during the participation and creel surveys are returned to the office and edited for completeness and legibility before the data are entered into structured computer data bases by using commercially available data base management software. Edit and summary reports are produced to verify the quality of the data, and any errors are corrected in the data bases. Data bases are then translated into standard record formats, which are readable by the data processing and expansion systems programmed by WPACFIN specifically for the offshore and inshore surveys. As data are converted into the Guam Offshore Expansion System (GOES) and the Guam Inshore Expansion System (GIES), additional error checks are performed by the computer to ensure only valid information enters the expansion systems. Errors are flagged and printed to facilitate correction. The GOES and GIES are menu- driven systems that step the user through a series of processes that summarize creel survey and participation data to produce catch and effort expansion and species composition files and reports. Although the GOES and GIES allow processing data for whatever

time increment the user specifies, typically 1 month of data is processed at a time for the offshore surveys, and 3-month or annual data are combined for the inshore surveys.

Generally speaking, the expansion algorithms for the offshore and inshore surveys are very similar. Estimates of total catch, effort, and participation for each fishing method are generated from information collected during the participation and creel surveys. The GOES uses same-day catch and effort averages to expand the participation counts, whereas the GIES uses user-specified, time period catch and effort averages to expand the daily participation counts. Inshore day and night surveys are treated identically but separately. The daily estimates are considered measurements of the fisheries for that day. Average weekday and weekend-holiday estimates and their associated variances or confidence intervals are created from individual daily measurements. These are weighted by the number of each type of day in the month, or other timespan, and multiplied by proportionality constants to adjust for percent coverage to produce estimates of total catch, effort, and participation along with their confidence intervals. All steps in the expansion process are stratified by fishing method. The expansion systems produce several detailed summary reports and a summary expansion data file containing the final totals for all important catch and effort statistics. This summary expansion file is later used to produce the types of reports contained in this document.

Estimates of species composition of the expanded catch are obtained for each method by multiplying the calculated percent species composition of the surveyed catch by the expanded total catch. Percent species composition by fishing method is obtained from the sampled catch based on the average individual weight and the total number of individuals recorded for that species. The average size of each species is obtained by one of three methods, depending on the availability of data in the data base. If total weight and count information are available, the average size per individual is calculated by dividing the total weight by the total count. If total weight and count information are not available but individual weight measurements for a species are available, the average size per individual is calculated by dividing the sum of all individual weights by the total number of individuals weighed. If neither of these methods can be used because no size information is available in the data base, the user is asked to input the species' average size, which is then multiplied by its total count to estimate total sampled catch of that species. Therefore, percent species composition is calculated by dividing the estimated sampled weight of the species by the estimated total sampled weight of all species combined. The species composition programs produce summary reports for immediate reference and summary data files for later use by reporting and summarizing software for generating the types of reports contained in this document.

Catch, effort, and participation data collected during the seasonal fisheries for bigeye scad and juvenile rabbitfish are processed by hand. Interview records are scarce, so hand tabulations and expansions are made to produce ballpark estimates of catch.

DATA REPORTING SYSTEMS

The Guam data reporting systems are divided into two separate systems, one for reporting on the commercial landings data and one for reporting the results of the creel survey.

Commercial Landings

After completing all editing and quality control activities for the commercial landings data, monthly and annual summary reports by species are generated. The commercial landings reports section of this document includes monthly and annual reports for 1989. Each table contains information on the pounds, value, average price per pound, and number of recorded landings for each species or species group. The number of recorded landings ("RECORDS" in the tables) is a measurement of how many times each species was purchased, regardless of its number or weight in the landing. This statistic is provided to give an indication of the frequency each species is reported. The POUNDS can be divided by the RECORDS to calculate the average weight of each landing. Each monthly report contains a subtotal for the sum of all species combined for that month, and the December report also includes the annual total. Annual reports contain the total landings for each species and the total recorded landings for all species for the calendar year.

Included with the commercial landings summary reports are graphs of some of the important statistics. The following groupings of species, species categories, and abbreviations are used in the tables and graphs for Guam's commercial landings:

I. Pelagic Management Unit Species (PMUS)

- Mahimahi (dolphinfish)
- Marlin (probably all blue but possibly striped or black)
- Shortbill spearfish
- Sailfish
- Wahoo
- Sharks

II. Bottom Fish Management Unit Species (BMUS)

- Jacks (unclassified but excluding bigeye scad)
- Bottom fish (unclassified)
- Ehu (red snapper)
- Gindai (flower snapper)

Grouper
Kalekale (pink snapper)
Lehi (silverjaw snapper)
Onaga (red or longtail snapper)
Opakapaka (pink snapper)
Uku (gray snapper)
Emperorfish

III. Billfish

Marlin (probably all blue but possibly striped or black)
Shortbill spearfish
Sailfish

IV. Tunas

Tunas (unclassified)
Skipjack tuna
Yellowfin tuna
Dogtooth or white tuna
Kawakawa

V. Other Tuna

All the above tunas excluding skipjack and yellowfin tunas.

VI. Fisheries Categories

A. Pelagic Species

All PMUS and tuna species plus the following:
Troll fish (unclassified)
Barracuda
Rainbow runner

B. Bottom Fish

Same as the BMUS

C. Reef Fish

Reef fish (unclassified)
Giant wrasse
Rabbitfish
Rudderfish
Squirrelfish
Parrotfish
Snapper
Surgeonfish
Unicornfish
Goatfish

D. Other

Miscellaneous (unclassified)
Bigeye scad
Mullet
Eels
Milkfish
Invertebrates (unclassified)
Crabs (unclassified)
Coconut crab
Lobster
Shrimp
Octopus
Squid
Seaweeds
Imported

Creel Surveys

Two general types of reports are included in this document from the DAWR creel surveys, catch and effort expansion reports and species composition reports. These reports are produced by using the expansion and species composition files created by the GOES and GIES as input to a series of utility programs developed by WPACFIN. The utility programs reorganize, format, and summarize data from the GOES and GIES files to improve the presentation of the data and reduce the amount of space required to report the important statistics. Two of the most significant space saving improvements are the combining of many species into species groups, usually to the family level, and the combining of lesser used fishing methods into a single category. The original offshore and inshore species composition files contained about 300 different species categories, which were reduced to about 90 categories. For instance, 22 species of squirrelfish and 20 species of wrasse were reduced to just the 2 family groupings. All significant or important species retain their individual identity and are reported separately in the tables. In the original offshore species composition files, catches were reported for nine fishing methods; however, only two methods, trolling and bottom fishing, were significant as they generally accounted for over 97% of the catch. Therefore, reports of offshore species composition were reduced to just three method categories, trolling, bottom fishing, and other. Inshore species composition reports were reduced to totals only. Expansion reports for the inshore and offshore surveys include estimates of total catch and effort for each method recorded.

Monthly and annual catch and effort expansion reports and species composition reports are presented for the offshore fisheries for 1989. Monthly expansion and species composition reports have matching totals for catch by fishing method since the monthly species composition reports are based on the expansion files. Annual expansion and species composition

reports also have identical totals because the species reports were generated from the annual expansion files. However, the totals on the annual reports will not equal those obtained by adding all of the monthly files together because the annual expansion reports were generated by re-expanding the entire year's data together, thereby increasing the sample size significantly, and it is hoped, improving the annual estimates of percent species composition and of catch and effort and their associated coefficients of variation (CV's). This also makes expansion possible for months in which sampling was insufficient or nonexistent. The annual species composition reports were created by calculating annual percentages of species composition by combining all sampling for the year and then multiplying these percentages by the annual expansion totals. This allows calculation of percent species composition based on greatly increased sample size. Annual expansion and species composition reports are presented for the day and night inshore creel surveys for 1989. Combined day-night and offshore-inshore species composition reports are also presented.

Computer generated numbers and all totals in the reports are subject to rounding error. All catches are reported in pounds, and effort, in hours (boat hours for the offshore survey and gear hours for the inshore surveys). In the offshore expansion reports, the boat counts by fishing method will not add to the total boat count when the same boat was used for more than one method on a single trip. In these cases, the boat is included in the count for each method used but included only once in the total boat count. A separate CV is included for each statistic reported in the offshore expansion reports, but because of the differences in the offshore and inshore expansion algorithms, only a single CV is included for all statistics reported in the inshore expansion reports. The CV provides a measurement of the relative variation associated with the estimate preceding it and is calculated by dividing the standard error of the estimate by the estimate and multiplying by 100 and rounding to express the answer as a whole percentage. The larger the CV, the larger the relative variation in the data used to generate the estimate and, therefore, the less precise the estimate. An asterisk following a line means the number of samples collected for that method during that month were insufficient to properly calculate the CV. There must be at least two weekday and two weekend-holiday samples for each method to properly compute a standard error and, therefore, properly compute the CV. If an asterisk is present and the CV is greater than zero, then samples on either the weekdays or the weekend- holidays were sufficient to compute a standard error for that type of day but not for the other type of day. In this case, the CV provided in the report is for the type of day in which sample information met the minimum requirements for calculating CV. If an asterisk is present and the CV equals zero, then neither day had sufficient number of samples to calculate CV. It follows then, anytime an asterisk is present for any of the methods, the totals for the month are questionable.

In the offshore expansion reports, average monthly catch per unit of effort (CPUE) is calculated by using the same type of algorithm as for the other expansion elements, and it has an associated CV. First, the average daily CPUE is calculated by dividing the total weight of the fish sampled for a day by the total number of hours fished to produce that catch. Next, the average weekday and weekend-holiday CPUE's are calculated by summing the average daily CPUE's for each type of day and then dividing by the number of survey days for each type of day. These averages are multiplied by the number of weekdays and weekend-holidays, respectively, in that month, then the products are summed and divided by the total number of days in the month to produce the average monthly CPUE for each offshore fishing method. The average monthly offshore CPUE could also be calculated by dividing the estimated monthly catch by the estimated monthly boat hours, but this would provide no indication of the variability of the CPUE and also essentially weight the average CPUE by the level of participation. However, for the inshore fisheries, which have a much lower number of creel interviews, the average monthly CPUE by fishing method is calculated by combining catch and effort information over a large timespan and, therefore, does not have an associated CV. Thus, the CPUE's for inshore fishing methods are calculated by dividing the sum of the catch by the sum of the gear-hours for whatever time period is included in the expansion.

Offshore species composition reports provide estimated landings and percent species composition for each species or species group for the two major offshore fishing methods, trolling and bottom fishing; a total for all other methods combined; and an overall total for all methods. The combined offshore-inshore and inshore species composition reports provide the statistics only for all methods combined.

The reports for the 1989 Annual Guam International Fishing Derby include derby and species totals by day for a variety of catch and effort statistics. Four major pelagic species are targeted during the derby, including billfish (primary blue marlin), yellowfin tuna, mahimahi, and wahoo. Other species such as skipjack tuna, rainbow runner, and barracuda are caught incidentally, but sometimes in substantial quantities.

INTERPRETATION OF STATISTICS

The user is reminded again to pay heed to the precautions and assumptions identified earlier in this document, when making interpretations of or inferences from data reported in the tables and graphs. Remember also that neither the commercial landings summaries nor the creel summaries are based on a census of all the fishing activities, but on samples of those activities. Commercial landings reports are believed to include a high percentage of the actual commercial landings made on Guam. The creel survey expansion reports are based on surveys of the offshore and inshore fisheries conducted 4 times per month. One

Commercial landings reports are believed to include a high percentage of the actual commercial landings made on Guam. The creel survey expansion reports are based on surveys of the offshore and inshore fisheries conducted 4 times per month. One of the major factors in expanding the survey data into monthly and annual estimates is the use of proportionality constants to adjust for percent coverage of the surveys. The flexibility of the survey design allows for refinement of these constants as additional information is gained on Guam's fishing activities. If the constants are improved upon, the basic survey data can be re-expanded to create better overall estimates. However, the variability and species composition would not be expected to change since these statistics are strictly based on the actual survey information collected from the fishermen.

The creel survey reports in this section do not include estimates of catches made during the seasonal fisheries for bigeye scad,juvenile rabbitfish, and fusiliers. Therefore, the user must remember to adjust estimates of the total inshore and combined inshore-offshore fisheries. Based on a special sampling program designed to target these seasonal fisheries, the estimate for 1989 are 130,000, 4,000 and 2,000 pounds for bigeye scad, juvenile rabbitfish, and fusiliers respectively. The bigeye scad harvest was exceptionally high compared to previous years, but the juvenile rabbitfish did not run in as large of numbers as in 1988. Even though the number of fusiliers caught was not large, these numbers are above most years because these fish do not recruit in mass every year. The last year this fish appeared in any large quantity was in 1984.

Table IV.1.1

Guam 1989 Annual Commercial Landings

Species	Records	Pounds	Value	$/lb
Miscellaneous	10	198.00	368.63	1.86
Bigeye scad (atulai)	107	5,697.75	13,781.34	2.42
Jacks	54	1,045.25	1,747.31	1.67
Sharks	2	94.00	0.00	0.00
Bottom fish	218	4,861.25	12,012.98	2.47
Ehu (red snapper)	8	124.75	303.88	2.44
Gindai (flower snap)	5	53.25	145.63	2.73
Grouper	9	616.00	880.88	1.43
Kalikali (pink snap)	8	227.75	654.07	2.87
Lehi (silverjaw)	9	179.50	542.94	3.02
Onaga (red snapper)	30	531.25	2,586.25	4.87
Opakapaka (pink snp)	9	383.50	1,077.25	2.81
Uku (gray snapper)	25	375.75	658.38	1.75
Amberjack	8	152.25	278.44	1.83
Reef fish	105	5,424.75	11,709.14	2.16
Wrasse	1	2.00	4.00	2.00
Rabbitfish (hitting)	2	58.50	122.63	2.10
Emperor (mafute)	47	2,142.50	4,977.71	2.32
Squirrelfish	1	13.00	26.00	2.00
Parrotfish	2	41.50	93.37	2.25
Snapper	6	103.75	185.20	1.79
Unicornfish	3	76.00	166.50	2.19
Troll fish	31	321.00	552.87	1.72
Barracuda	143	1,662.25	2,592.05	1.56
Dolphin (mahimahi)	789	21,139.75	36,233.67	1.71
Marlin	315	43,490.75	38,764.78	0.89
Sailfish	19	1,325.25	1,356.10	1.02
Rainbow runner	35	384.50	588.87	1.53
Wahoo	1,100	30,567.04	60,826.73	1.99
Tunas	1	2.00	2.50	1.25
Skipjack tuna	698	21,974.00	21,558.26	0.98
Dogtooth tuna	61	1,516.25	2,481.20	1.64
Yellowfin tuna	295	10,905.50	20,687.40	1.90
Kawakawa	6	22.25	27.82	1.25
Lobster	7	123.50	400.25	3.24
Octopus	3	43.50	105.00	2.41
Imported	1	91.00	250.25	2.75
** TOTAL **	4,173	155,970.79	238,750.28	

Table IV.1.2

Guam January 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Jacks	2	58.50	87.75	1.50
Reef fish	1	36.50	73.00	2.00
Barracuda	3	31.50	47.25	1.50
Dolphin (mahimahi)	142	6,377.00	9,699.45	1.52
Marlin	3	245.50	245.50	1.00
Rainbow runner	2	11.00	16.50	1.50
Wahoo	35	770.75	1,448.71	1.88
Skipjack tuna	21	709.25	710.00	1.00
Dogtooth tuna	1	7.00	10.50	1.50
Yellowfin tuna	14	449.50	815.11	1.81
** SUBTOTAL **	224	8,696.50	13,153.77	

Table IV.1.3

Guam February 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Jacks	3	184.50	276.75	1.50
Bottom fish	15	272.50	596.00	2.19
Grouper	2	274.50	274.50	1.00
Uku (gray snapper)	1	4.00	6.00	1.50
Reef fish	4	131.50	283.00	2.15
Barracuda	13	136.25	204.37	1.50
Dolphin (mahimahi)	100	4,304.75	7,693.61	1.79
Marlin	5	381.00	381.00	1.00
Wahoo	54	3,431.75	6,338.97	1.85
Skipjack tuna	28	519.75	602.50	1.16
Dogtooth tuna	2	23.50	35.25	1.50
Yellowfin tuna	15	565.00	1,067.74	1.89
** SUBTOTAL **	242	10,229.00	17,759.69	

Table IV.1.4

Guam March 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Miscellaneous	1	7.00	8.75	1.25
Jacks	10	125.25	189.37	1.51
Sharks	2	94.00	0.00	0.00
Bottom fish	79	1,506.75	3,535.58	2.35
Gindai (flower snap)	1	6.75	16.88	2.50
Lehi (silverjaw)	1	17.75	57.69	3.25
Uku (gray snapper)	6	95.75	152.63	1.59
Reef fish	1	10.00	22.50	2.25
Emperor (mafute)	10	208.75	494.18	2.37
Snapper	1	16.25	28.45	1.75
Barracuda	12	151.50	227.27	1.50
Dolphin (mahimahi)	139	3,029.00	5,529.99	1.83
Marlin	4	350.50	350.50	1.00
Sailfish	3	119.50	146.50	1.23
Rainbow runner	5	66.50	120.55	1.81
Wahoo	104	4,095.25	7,563.87	1.85
Skipjack tuna	73	1,377.00	1,634.91	1.19
Dogtooth tuna	13	228.50	342.76	1.50
Yellowfin tuna	32	610.25	1,181.13	1.94
** SUBTOTAL **	497	12,116.25	21,603.51	

Table IV.1.5

Guam April 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	1	54.50	136.25	2.50
Jacks	2	42.50	65.87	1.55
Bottom fish	9	249.75	521.81	2.09
Ehu (red snapper)	1	6.50	13.00	2.00
Kalikali (pink snap)	1	15.50	31.00	2.00
Opakapaka (pink snp)	1	77.00	173.25	2.25
Uku (gray snapper)	1	21.00	31.50	1.50
Reef fish	4	363.00	599.50	1.65
Barracuda	13	123.25	184.89	1.50
Dolphin (mahimahi)	69	2,293.75	3,716.19	1.62
Marlin	21	2,512.75	2,788.84	1.11
Sailfish	1	26.00	32.50	1.25
Rainbow runner	1	12.00	18.00	1.50
Wahoo	34	1,167.25	2,087.35	1.79
Skipjack tuna	64	3,365.75	2,968.82	0.88
Dogtooth tuna	9	224.75	337.13	1.50
Yellowfin tuna	34	1,734.00	3,155.20	1.82
** SUBTOTAL **	266	12,289.25	16,861.10	

Table IV.1.6

Guam May 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	4	162.50	416.37	2.56
Jacks	7	70.25	115.13	1.64
Bottom fish	18	352.50	909.79	2.58
Grouper	1	22.50	61.88	2.75
Onaga (red snapper)	3	99.00	495.00	5.00
Amberjack	1	9.00	13.50	1.50
Reef fish	7	408.25	886.38	2.17
Emperor (mafute)	2	25.00	54.75	2.19
Barracuda	11	136.75	191.43	1.40
Dolphin (mahimahi)	33	767.25	1,392.02	1.81
Marlin	27	3,734.75	3,383.40	0.91
Rainbow runner	1	1.75	3.06	1.75
Wahoo	31	899.79	1,637.01	1.82
Skipjack tuna	52	3,073.00	2,651.68	0.86
Dogtooth tuna	10	212.50	340.94	1.60
Yellowfin tuna	32	1,015.50	1,960.25	1.93
** SUBTOTAL **	240	10,990.29	14,512.59	

Table IV.1.7

Guam June 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	2	74.50	186.25	2.50
Jacks	5	127.00	195.25	1.54
Bottom fish	10	199.75	518.13	2.59
Amberjack	1	30.00	45.00	1.50
Reef fish	13	967.00	2,154.77	2.23
Emperor (mafute)	1	47.50	106.88	2.25
Barracuda	3	42.00	63.00	1.50
Marlin	32	4,964.50	4,349.26	0.88
Sailfish	1	36.50	36.50	1.00
Rainbow runner	4	32.50	56.76	1.75
Wahoo	18	692.50	1,389.37	2.01
Skipjack tuna	42	2,313.75	2,228.76	0.96
Dogtooth tuna	3	73.00	117.87	1.61
Yellowfin tuna	28	906.75	1,813.50	2.00
Lobster	1	12.50	43.75	3.50
** SUBTOTAL **	164	10,519.75	13,305.05	

Table IV.1.8

Guam July 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Miscellaneous	1	4.00	10.00	2.50
Bigeye scad (atulai)	10	531.75	1,316.50	2.48
Jacks	6	125.00	187.38	1.50
Bottom fish	12	290.00	662.46	2.28
Ehu (red snapper)	4	84.25	221.13	2.62
Gindai (flower snap)	3	44.50	123.75	2.78
Grouper	1	124.00	124.00	1.00
Kalikali (pink snap)	4	116.25	338.82	2.91
Lehi (silverjaw)	2	44.75	134.25	3.00
Onaga (red snapper)	2	34.75	156.25	4.50
Opakapaka (pink snp)	3	84.50	238.00	2.82
Uku (gray snapper)	3	28.50	57.00	2.00
Amberjack	2	26.25	45.94	1.75
Reef fish	8	739.50	1,663.89	2.25
Emperor (mafute)	4	105.00	244.76	2.33
Snapper	1	19.00	38.00	2.00
Unicornfish	1	22.00	44.00	2.00
Barracuda	13	108.00	171.49	1.59
Marlin	48	7,811.50	5,270.94	0.67
Sailfish	1	57.50	57.50	1.00
Rainbow runner	6	62.25	111.25	1.79
Wahoo	20	650.25	1,347.56	2.07
Skipjack tuna	49	2,592.50	2,417.12	0.93
Dogtooth tuna	1	19.50	29.25	1.50
Yellowfin tuna	26	1,167.50	2,335.00	2.00
Lobster	1	9.50	33.25	3.50
** SUBTOTAL **	232	14,902.50	17,379.49	

Table IV.1.9

Guam August 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Miscellaneous	1	26.00	58.50	2.25
Bigeye scad (atulai)	31	1,515.00	3,712.11	2.45
Jacks	6	147.75	300.81	2.04
Bottom fish	11	336.50	898.87	2.67
Ehu (red snapper)	1	21.50	32.25	1.50
Grouper	2	171.00	354.00	2.07
Kalikali (pink snap)	1	58.00	174.00	3.00
Lehi (silverjaw)	2	40.00	120.00	3.00
Onaga (red snapper)	7	183.25	916.25	5.00
Opakapaka (pink snp)	4	141.50	424.50	3.00
Uku (gray snapper)	2	80.00	160.00	2.00
Amberjack	2	34.50	69.00	2.00
Reef fish	20	1,153.00	2,539.38	2.20
Rabbitfish (hitting)	1	46.50	104.63	2.25
Emperor (mafute)	3	338.00	845.00	2.50
Snapper	2	44.00	77.00	1.75
Unicornfish	1	4.00	10.00	2.50
Barracuda	9	203.25	344.62	1.70
Dolphin (mahimahi)	13	956.50	1,021.12	1.07
Marlin	90	12,369.25	11,153.42	0.90
Sailfish	4	370.00	370.00	1.00
Rainbow runner	7	39.00	68.50	1.76
Wahoo	37	1,446.75	2,940.37	2.03
Skipjack tuna	76	3,295.00	3,102.75	0.94
Dogtooth tuna	7	171.00	338.50	1.98
Yellowfin tuna	42	1,300.00	2,618.75	2.01
Lobster	4	71.50	218.25	3.05
Octopus	2	9.50	28.50	3.00
** SUBTOTAL **	388	24,572.25	33,001.08	

Table IV.1.10

Guam September 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Miscellaneous	5	144.50	256.00	1.77
Bigeye scad (atulai)	24	1,994.00	4,783.44	2.40
Jacks	9	118.50	237.00	2.00
Bottom fish	26	747.00	2,034.73	2.72
Grouper	3	24.00	66.50	2.77
Kalikali (pink snap)	1	33.00	99.00	3.00
Lehi (silverjaw)	3	52.50	157.50	3.00
Onaga (red snapper)	5	60.75	303.75	5.00
Opakapaka (pink snp)	1	80.50	241.50	3.00
Uku (gray snapper)	10	136.50	234.50	1.72
Amberjack	1	32.50	65.00	2.00
Reef fish	28	1,120.75	2,391.38	2.13
Wrasse	1	2.00	4.00	2.00
Rabbitfish (hitting)	1	12.00	18.00	1.50
Emperor (mafute)	20	1,115.00	2,540.39	2.28
Squirrelfish	1	13.00	26.00	2.00
Parrotfish	1	6.00	13.50	2.25
Snapper	1	11.50	28.75	2.50
Unicornfish	1	50.00	112.50	2.25
Troll fish	1	86.00	86.00	1.00
Barracuda	16	163.00	244.50	1.50
Dolphin (mahimahi)	3	124.00	164.50	1.33
Marlin	38	4,578.50	4,060.42	0.89
Rainbow runner	3	14.50	26.25	1.81
Wahoo	21	806.00	1,637.75	2.03
Skipjack tuna	37	1,113.00	1,112.74	1.00
Dogtooth tuna	8	342.00	635.50	1.86
Yellowfin tuna	23	1,404.25	2,806.37	2.00
Lobster	1	30.00	105.00	3.50
** SUBTOTAL **	293	14,415.25	24,492.47	

Table IV.1.11

Guam October 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Miscellaneous	2	16.50	35.38	2.14
Bigeye scad (atulai)	19	661.50	1,595.30	2.41
Jacks	2	32.00	64.00	2.00
Bottom fish	25	482.50	1,289.24	2.67
Gindai (flower snap)	1	2.00	5.00	2.50
Kalikali (pink snap)	1	5.00	11.25	2.25
Lehi (silverjaw)	1	24.50	73.50	3.00
Onaga (red snapper)	6	57.50	287.50	5.00
Uku (gray snapper)	1	6.50	9.75	1.50
Amberjack	1	20.00	40.00	2.00
Reef fish	6	160.50	361.11	2.25
Emperor (mafute)	4	296.00	674.12	2.28
Snapper	1	13.00	13.00	1.00
Barracuda	13	175.00	271.49	1.55
Dolphin (mahimahi)	6	270.00	383.25	1.42
Marlin	31	4,194.00	3,906.62	0.93
Sailfish	5	578.50	541.60	0.94
Rainbow runner	1	117.00	117.00	1.00
Wahoo	31	2,292.50	5,086.98	2.22
Skipjack tuna	47	1,098.00	1,058.12	0.96
Dogtooth tuna	1	11.00	16.50	1.50
Yellowfin tuna	12	364.00	716.24	1.97
** SUBTOTAL **	217	10,877.50	16,556.95	

Table IV.1.12

Guam November 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	15	697.50	1,618.87	2.32
Bottom fish	10	389.00	941.37	2.42
Onaga (red snapper)	1	5.00	25.00	5.00
Reef fish	11	300.75	657.73	2.19
Emperor (mafute)	2	3.75	8.88	2.37
Parrotfish	1	35.50	79.87	2.25
Troll fish	29	222.50	445.00	2.00
Barracuda	19	185.75	284.74	1.53
Dolphin (mahimahi)	52	742.00	1,677.23	2.26
Marlin	7	940.50	902.00	0.96
Sailfish	2	88.75	103.75	1.17
Rainbow runner	4	21.00	37.00	1.76
Wahoo	460	8,682.75	17,070.35	1.97
Tunas	1	2.00	2.50	1.25
Skipjack tuna	76	1,304.50	1,443.64	1.11
Dogtooth tuna	6	203.50	277.00	1.36
Yellowfin tuna	12	977.25	1,286.48	1.32
Kawakawa	2	12.75	15.95	1.25
Octopus	1	34.00	76.50	2.25
** SUBTOTAL **	711	14,848.75	26,953.86	

Table IV.1.13

Guam December 1989 Commercial Landings

Species	Records	Pounds	Value	$/lb
Bigeye scad (atulai)	1	6.50	16.25	2.50
Jacks	2	14.00	28.00	2.00
Bottom fish	3	35.00	105.00	3.00
Ehu (red snapper)	2	12.50	37.50	3.00
Onaga (red snapper)	6	91.00	402.50	4.42
Uku (gray snapper)	1	3.50	7.00	2.00
Reef fish	2	34.00	76.50	2.25
Emperor (mafute)	1	3.50	8.75	2.50
Troll fish	1	12.50	21.87	1.75
Barracuda	18	206.00	357.00	1.73
Dolphin (mahimahi)	232	2,275.50	4,956.31	2.18
Marlin	9	1,408.00	1,972.88	1.40
Sailfish	2	48.50	67.75	1.40
Rainbow runner	1	7.00	14.00	2.00
Wahoo	255	5,631.50	12,278.44	2.18
Skipjack tuna	133	1,212.50	1,627.22	1.34
Yellowfin tuna	25	411.50	931.63	2.26
Kawakawa	4	9.50	11.87	1.25
Imported	1	91.00	250.25	2.75
** SUBTOTAL **	699	11,513.50	23,170.72	
** TOTAL **	4,173	155,970.79	238,750.28	

Figure IV.1.1

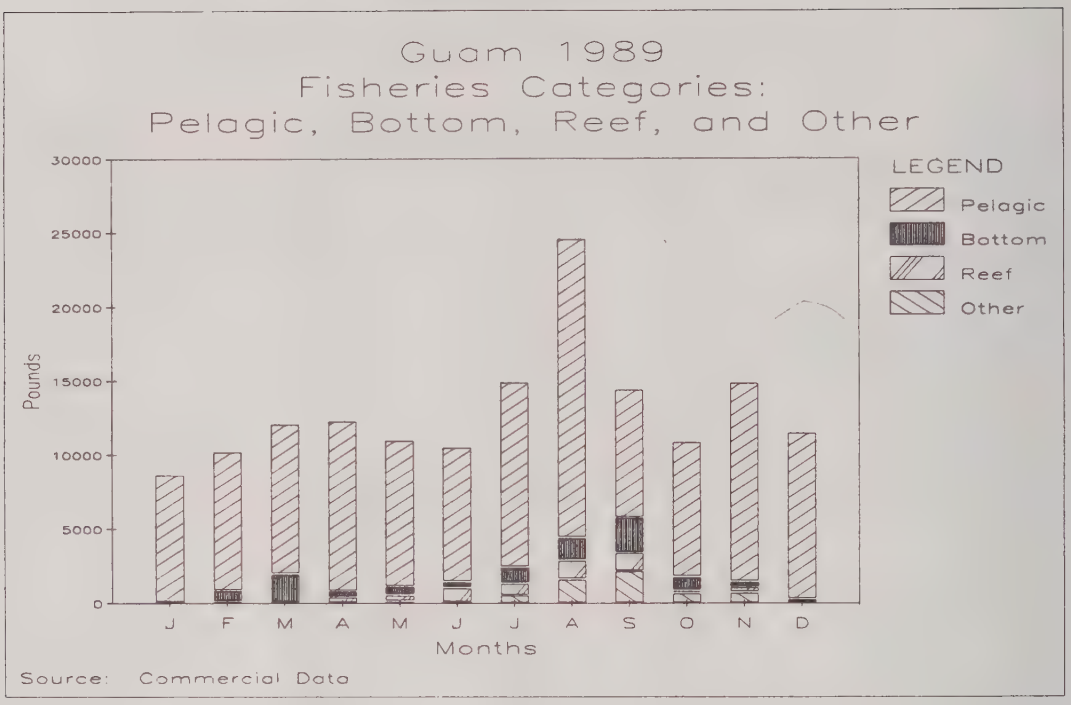


Figure IV.1.2

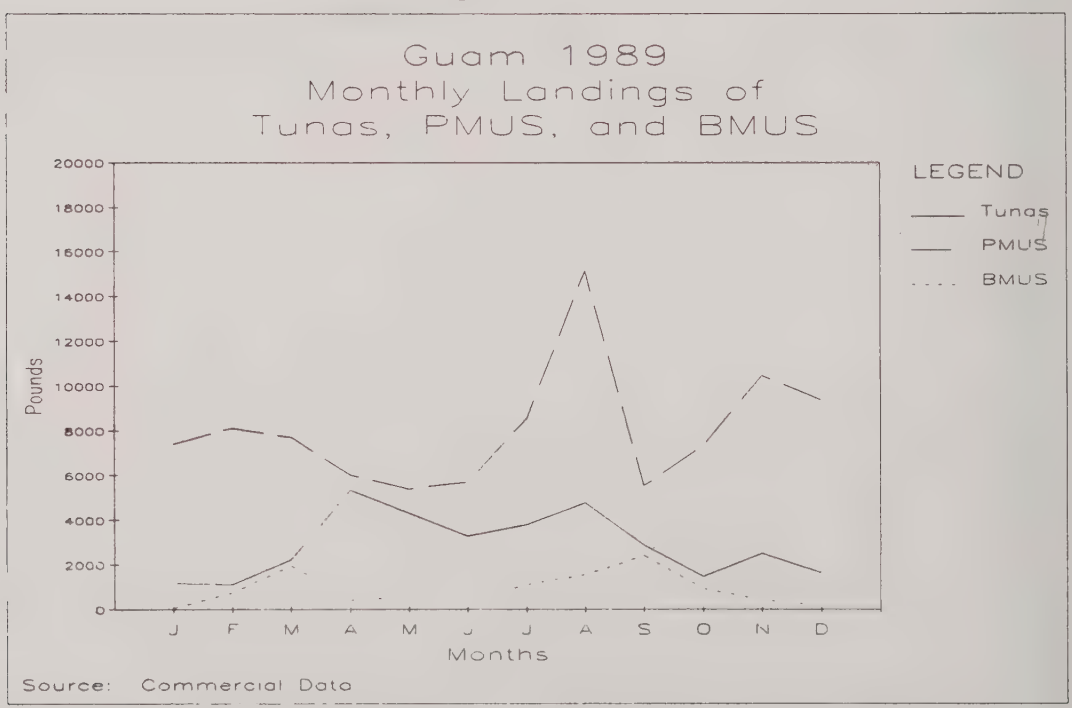


Figure IV.1.3

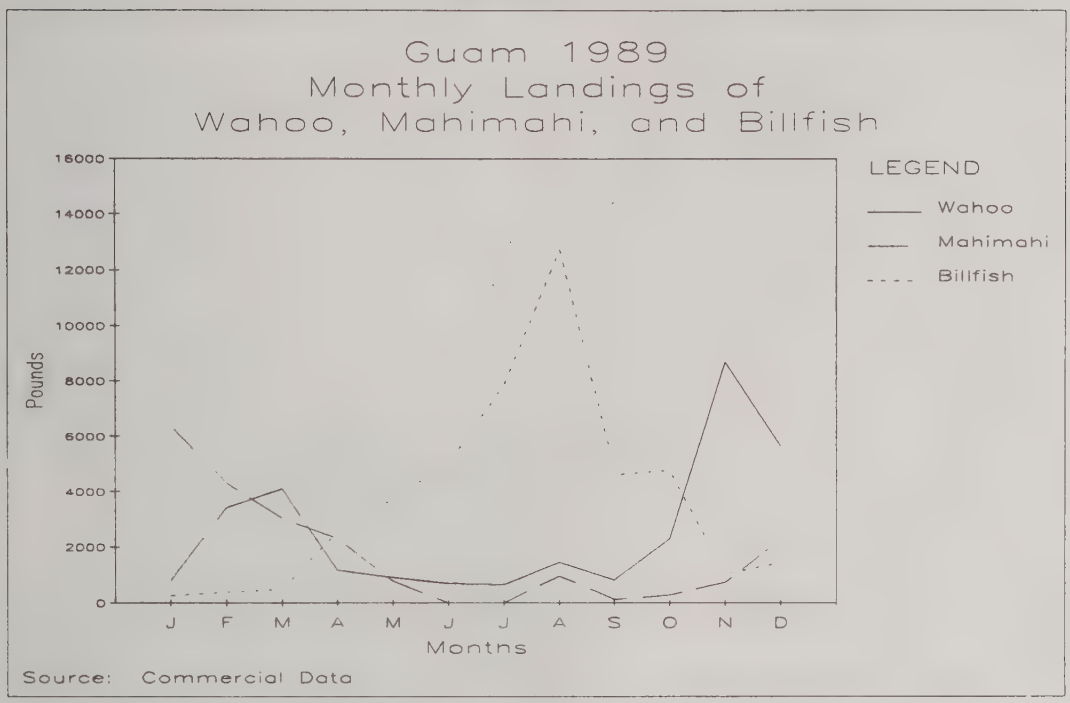


Figure IV.1.4

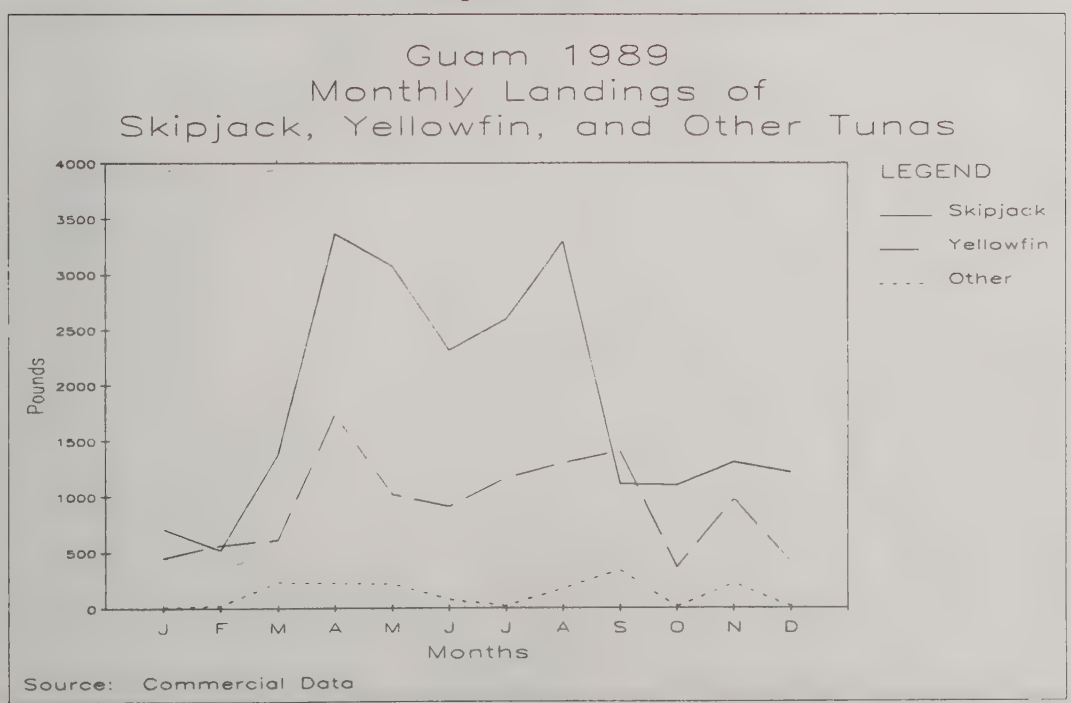
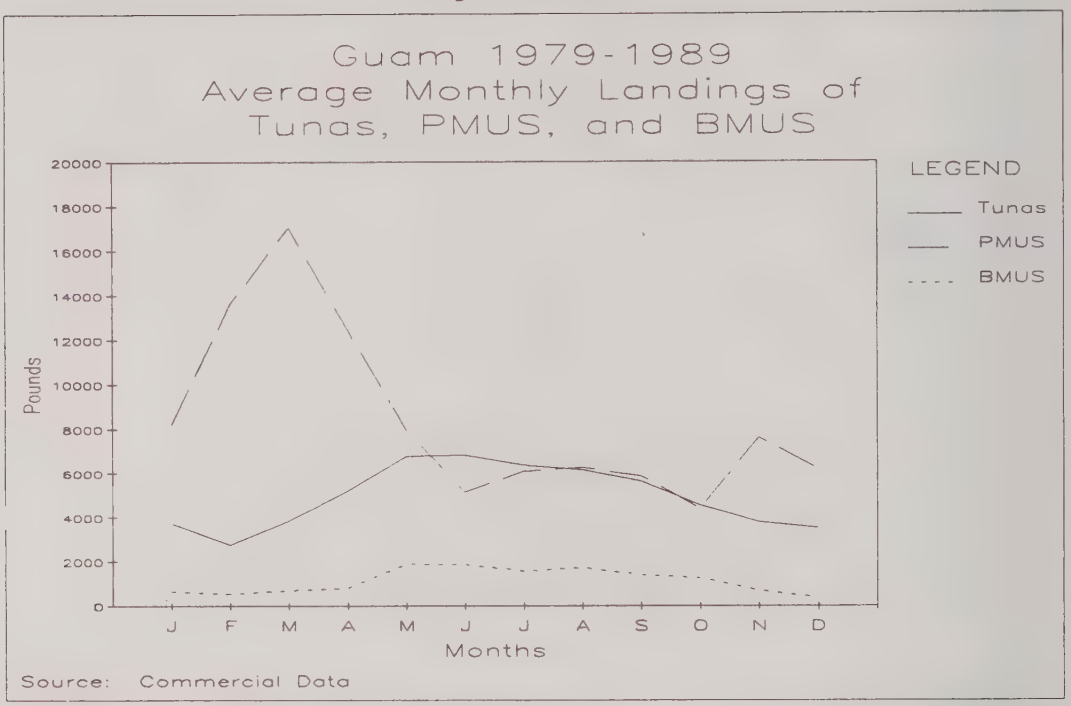


Figure IV.2.1



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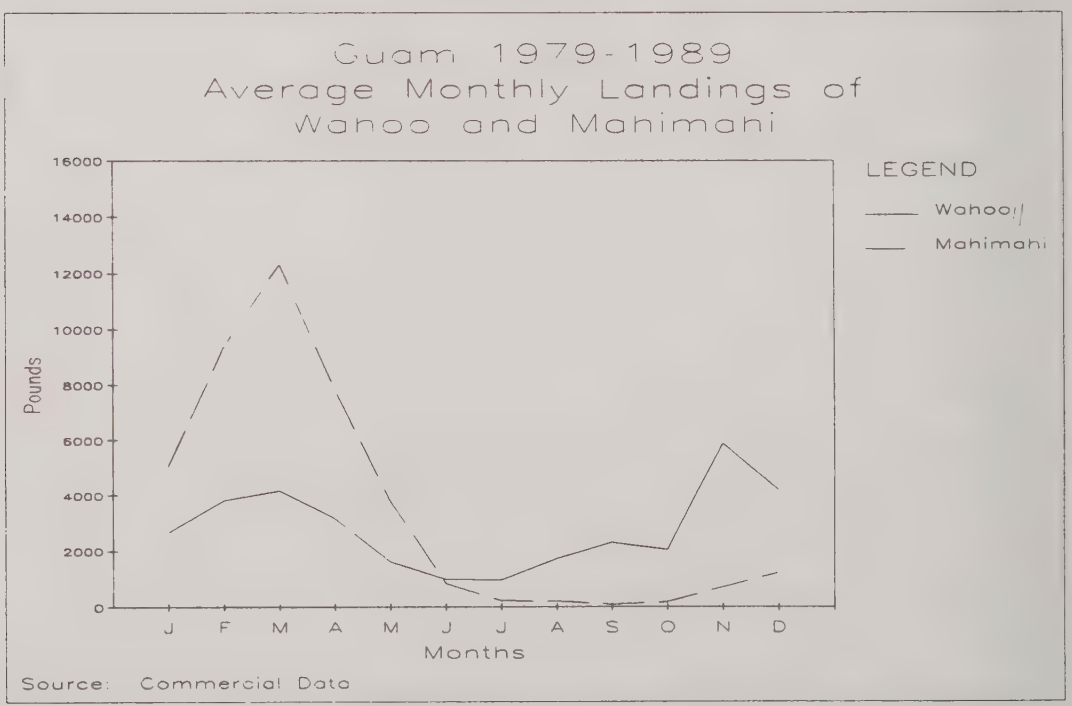

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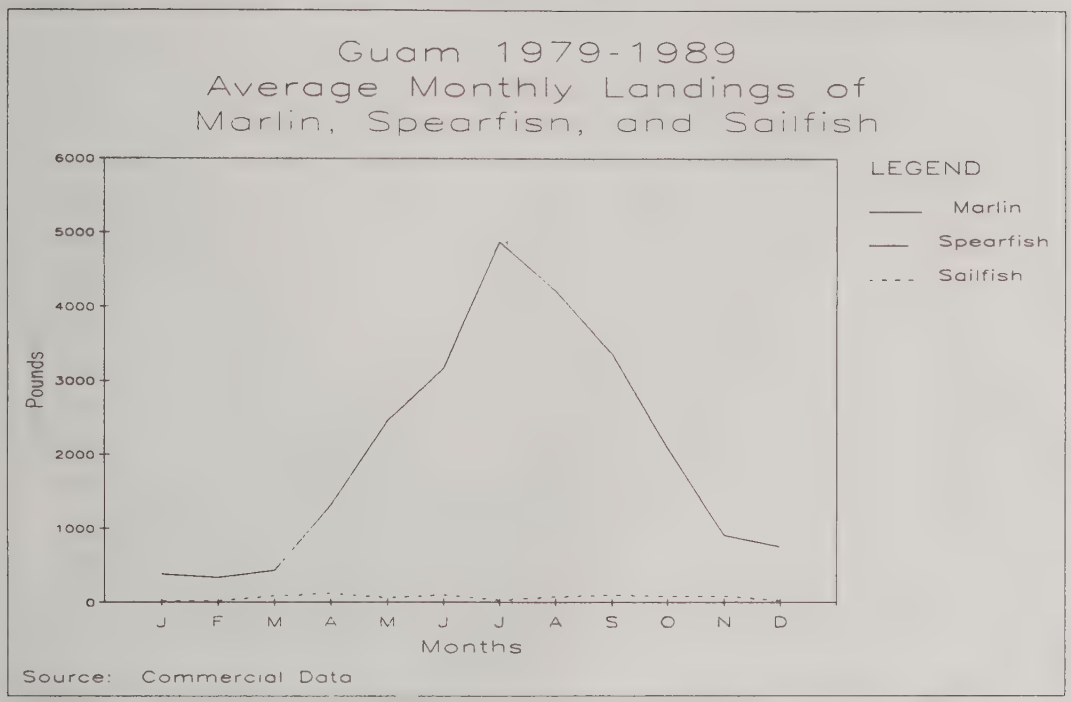

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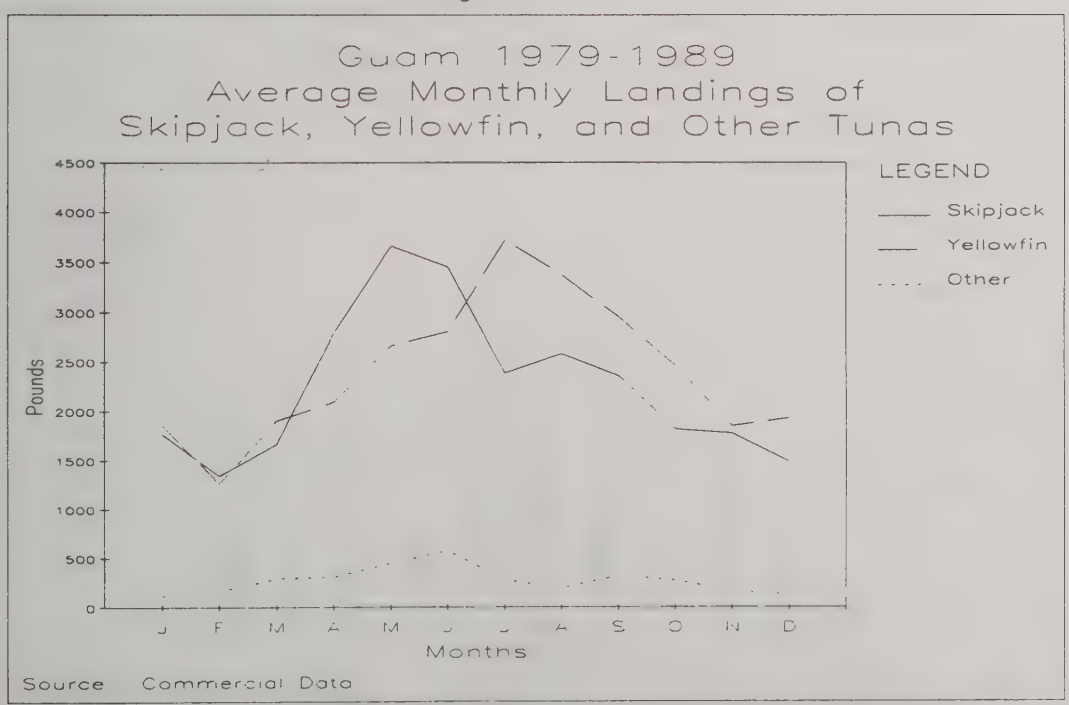


Figure IV.2.5

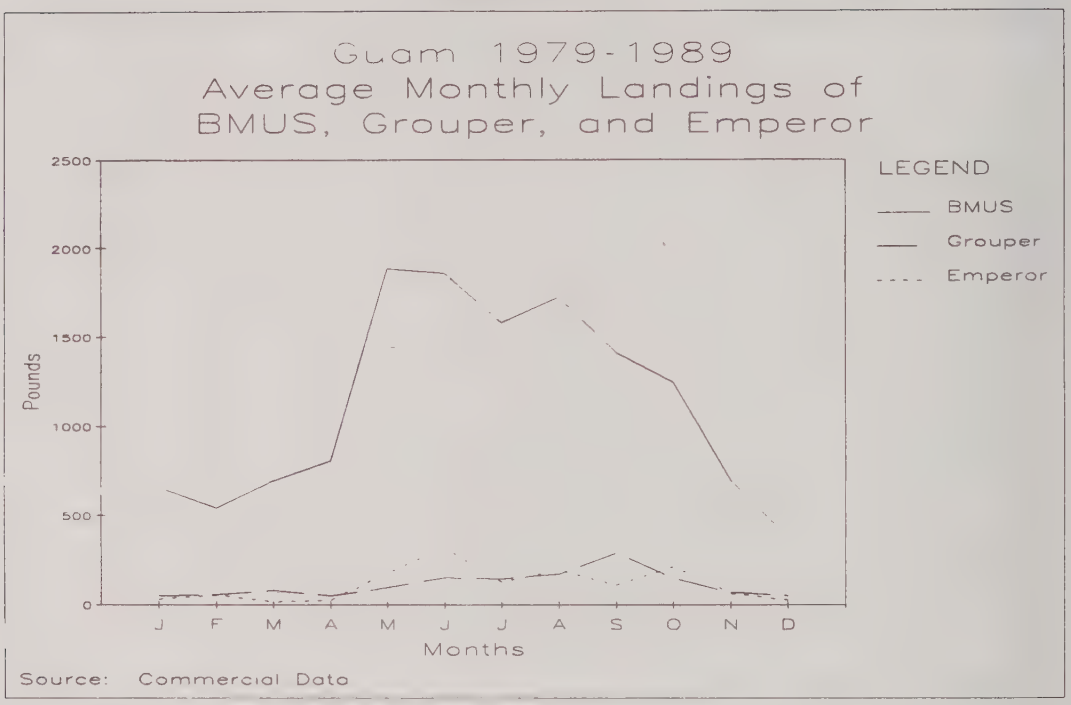
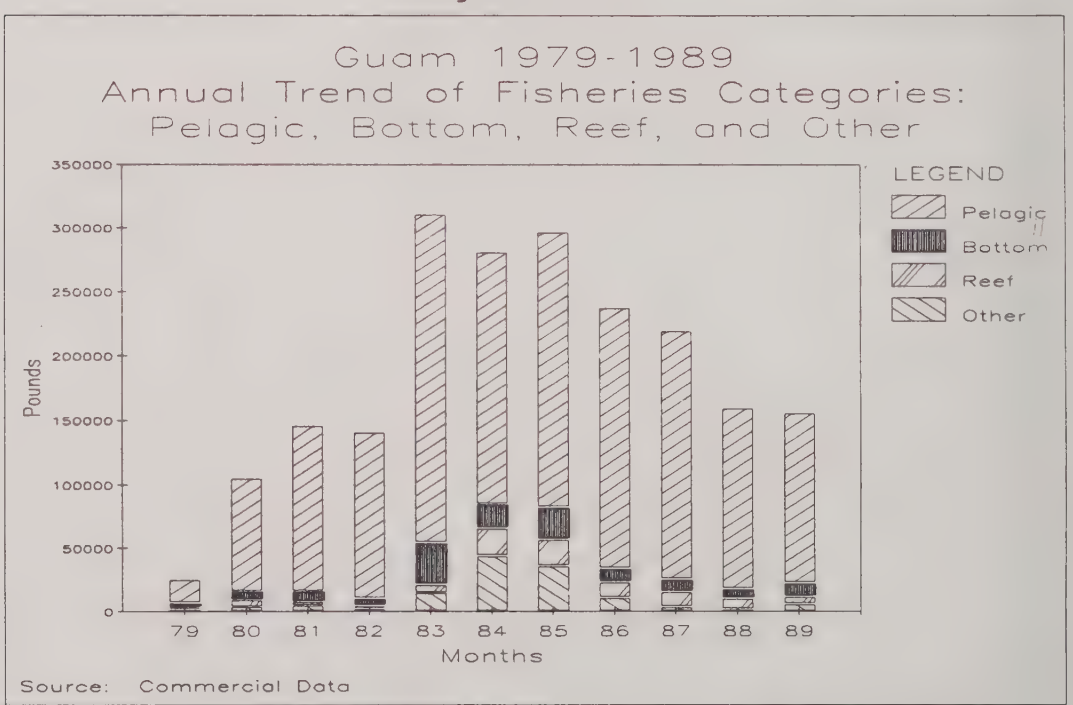


Figure IV.3.1



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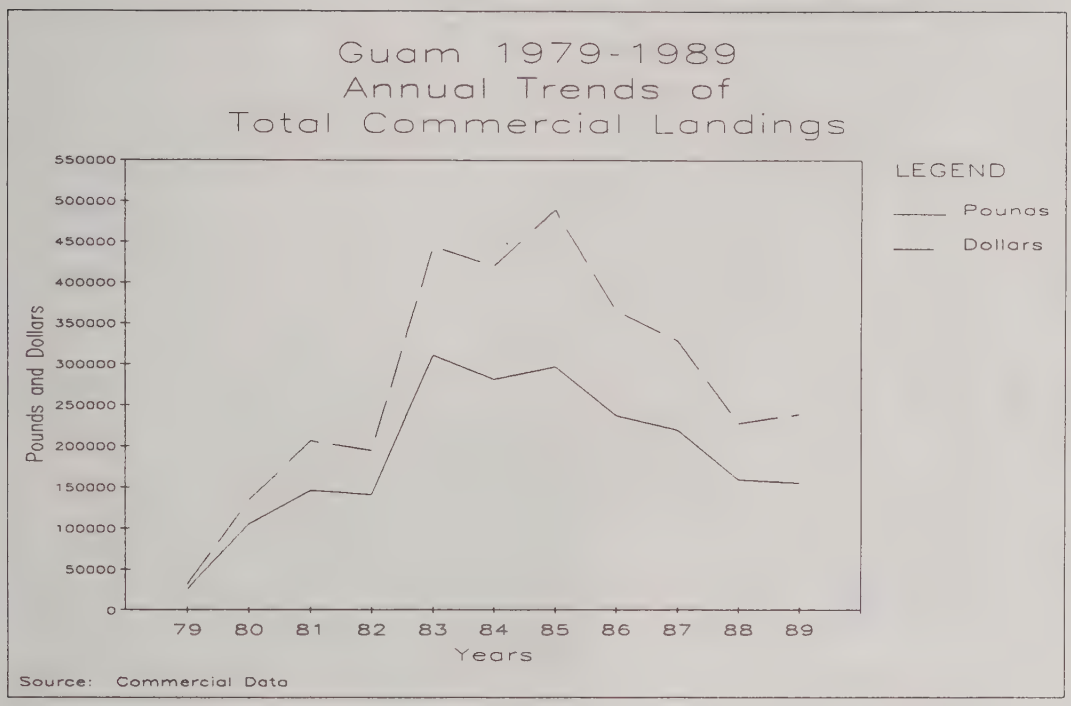

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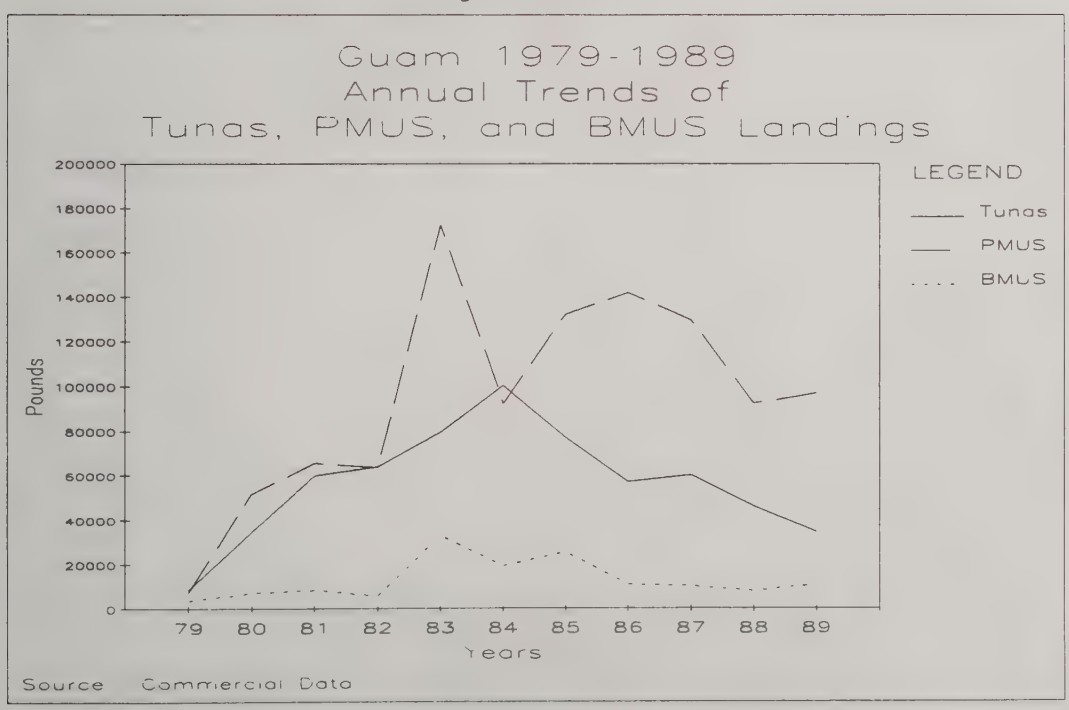

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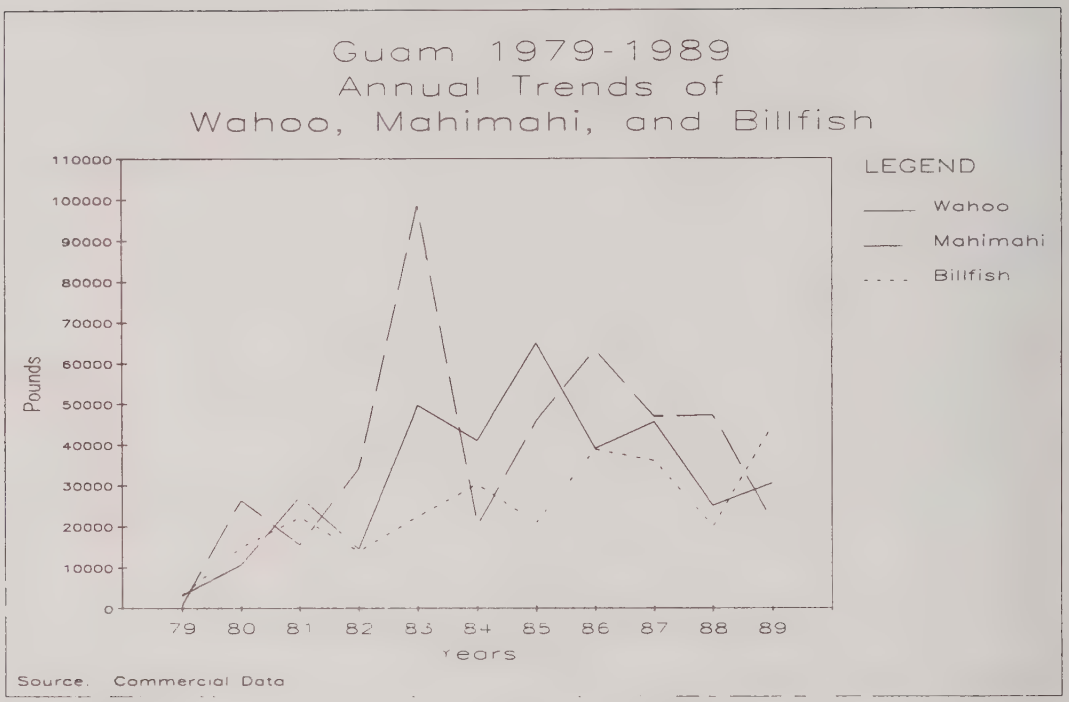

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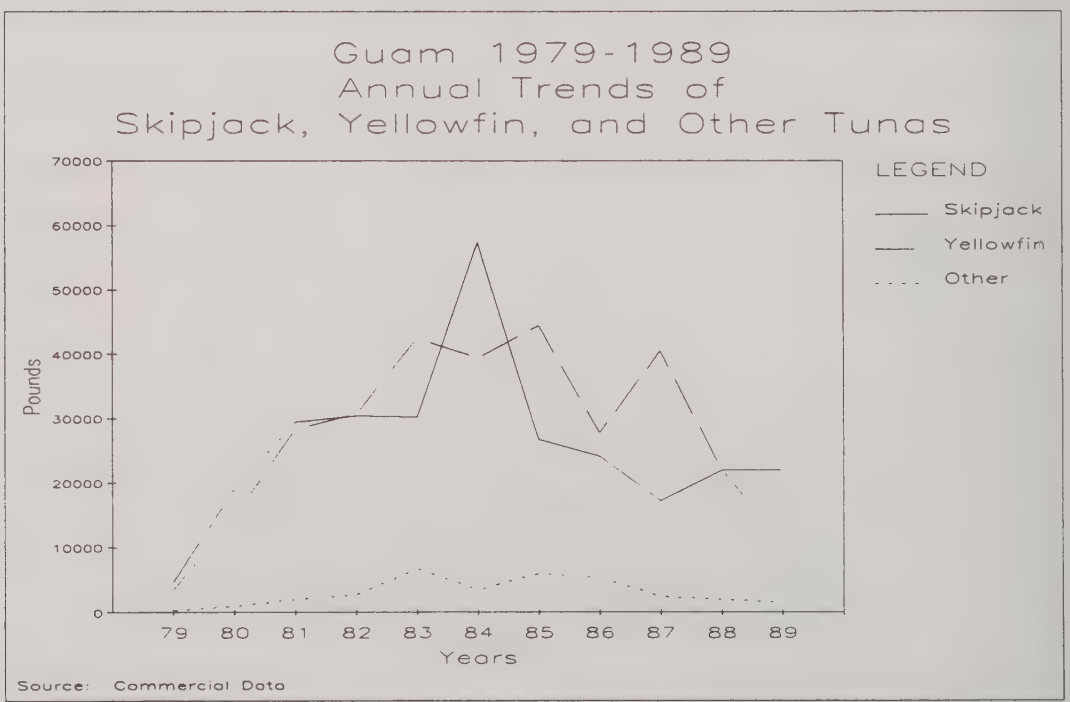


Figure IV.4.1

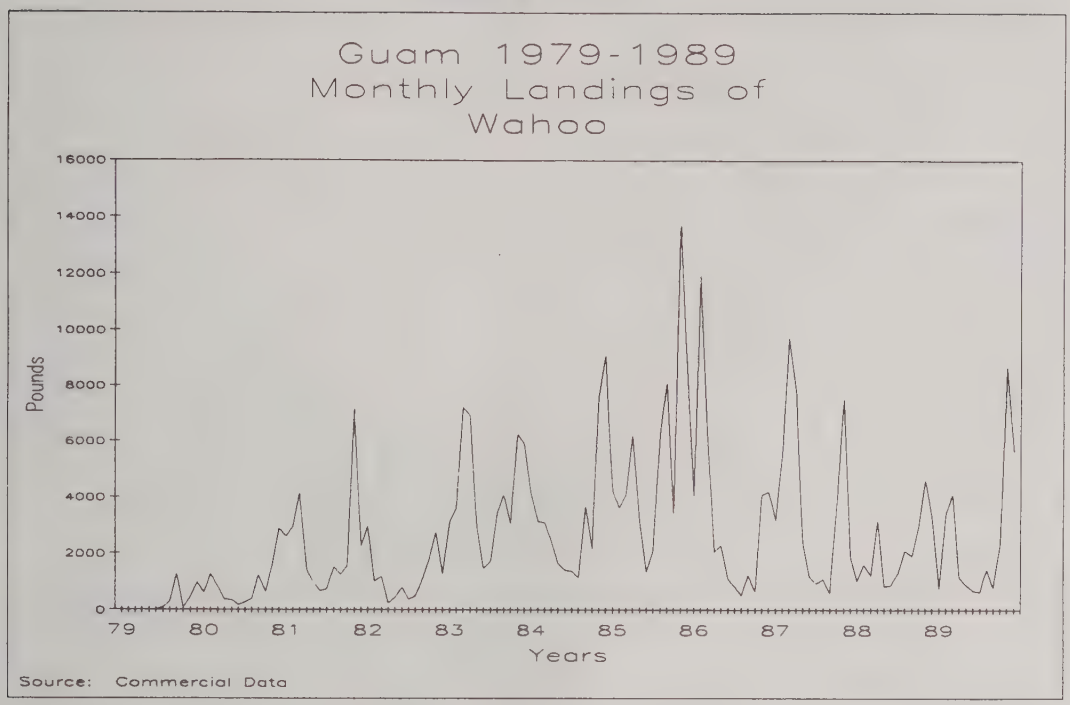


Figure IV.4.2

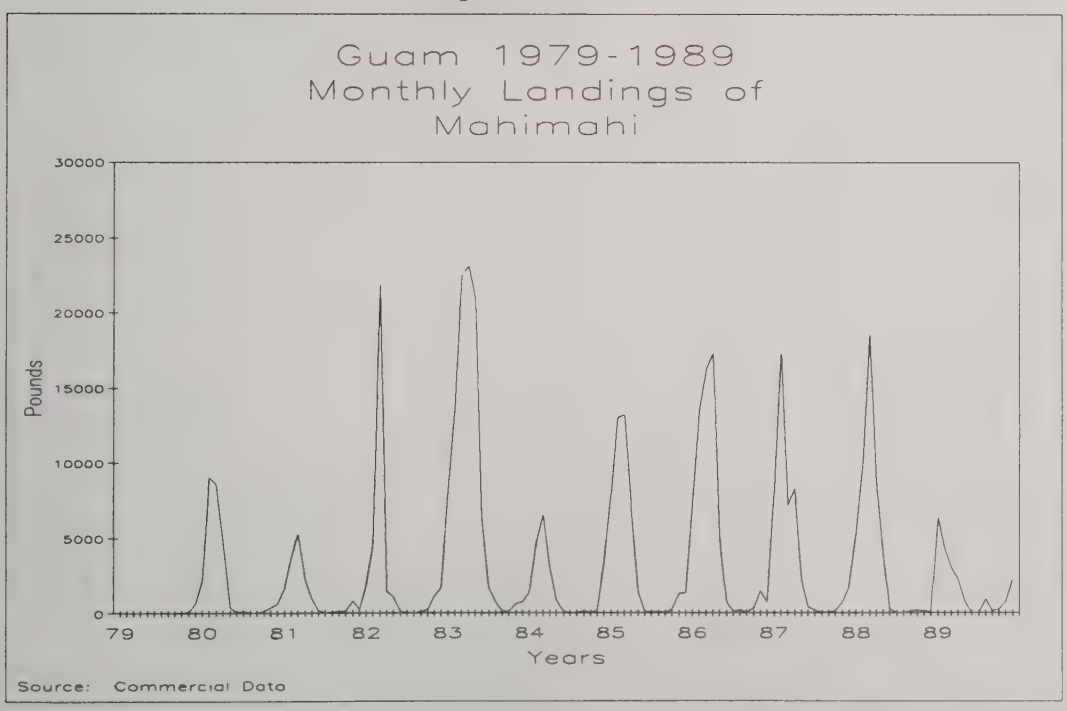


Figure IV.4.3

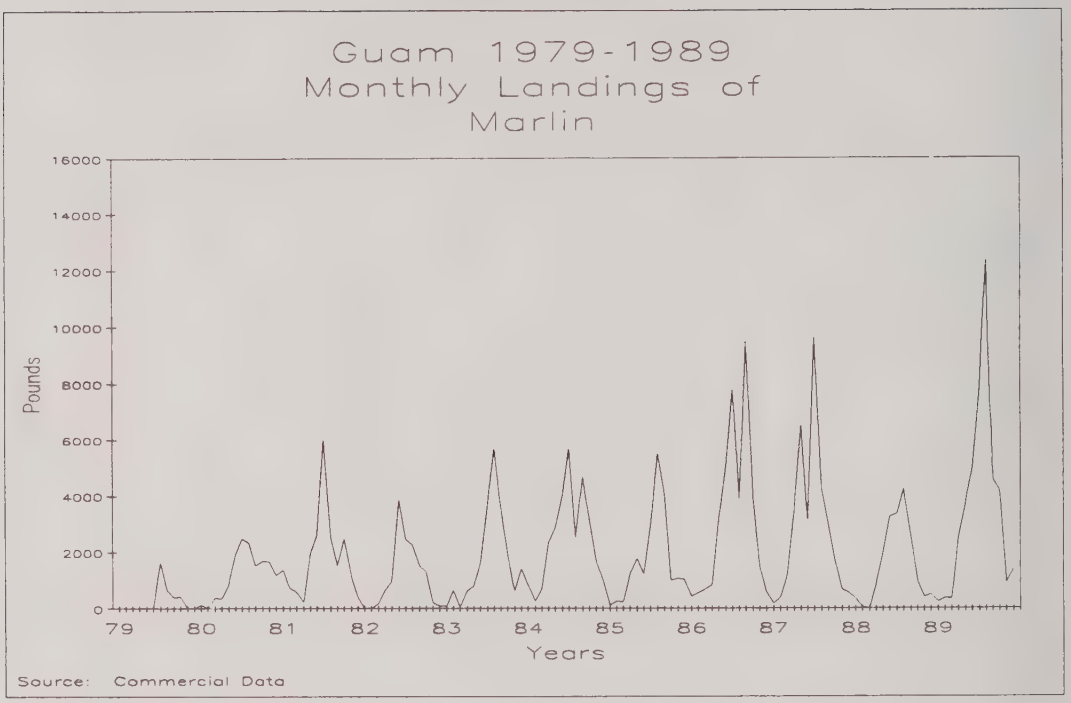


Figure IV.4.4

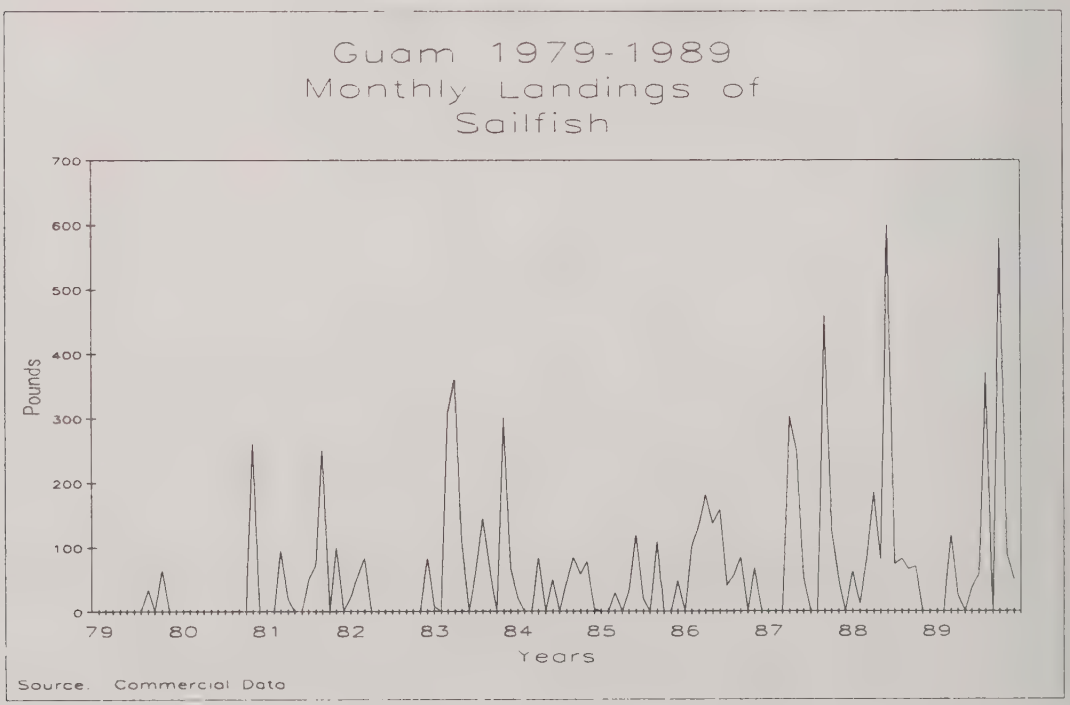


Figure IV.4.5

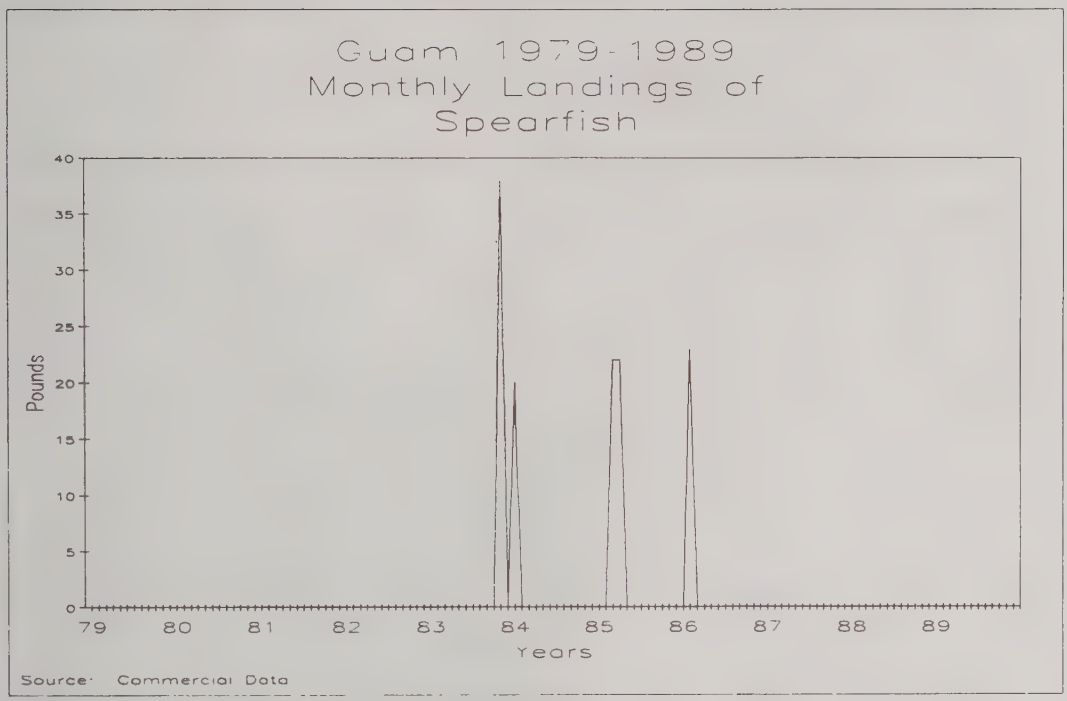


Figure IV.4.6

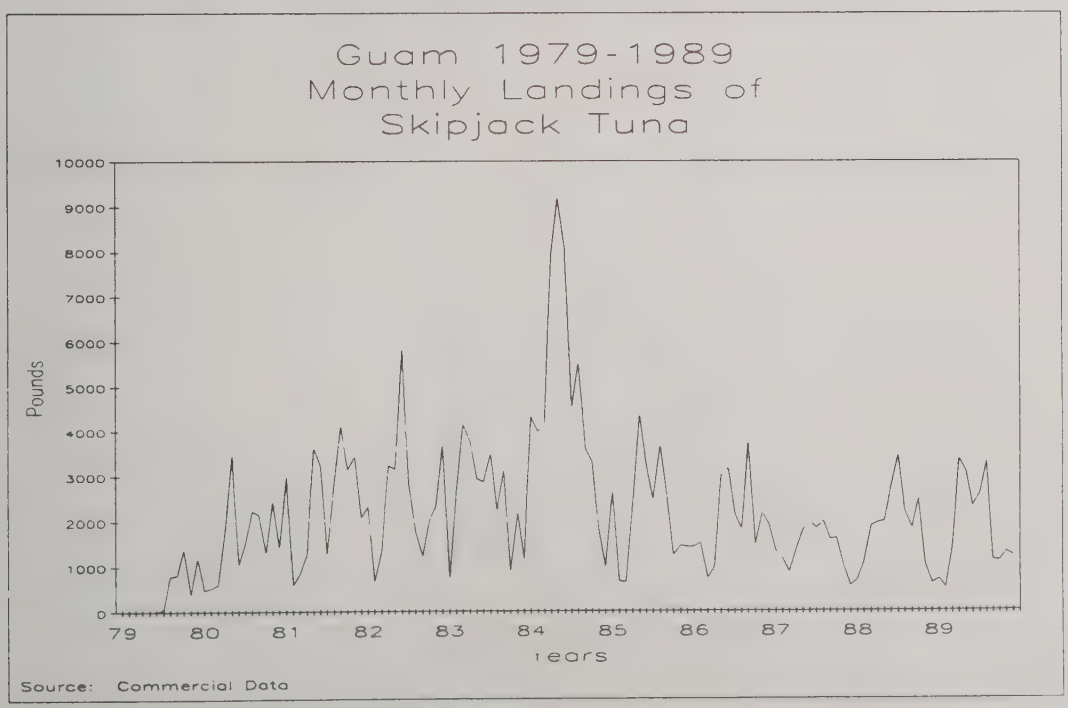


Figure IV.4.7

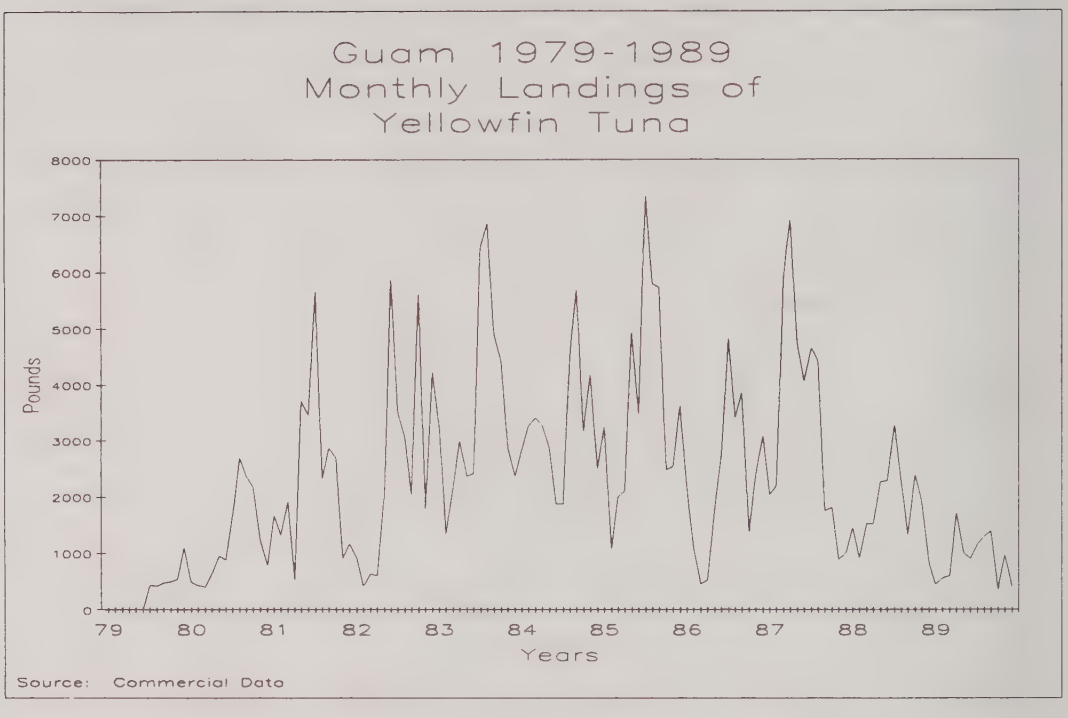


Figure IV.4.8

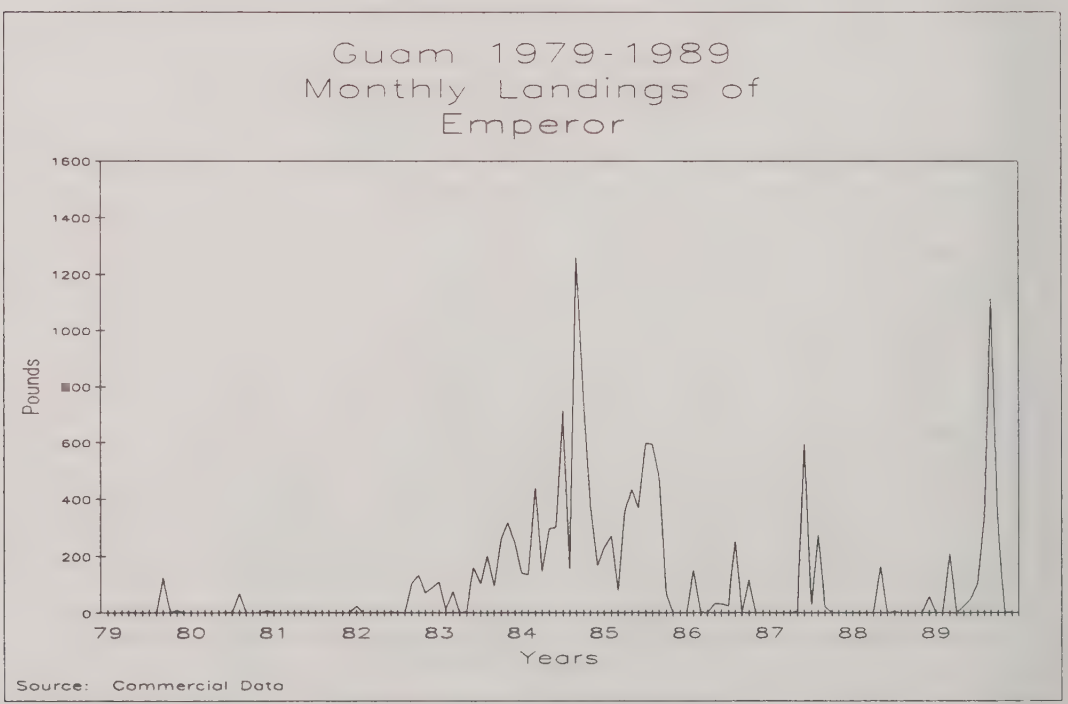


Figure IV.4.9

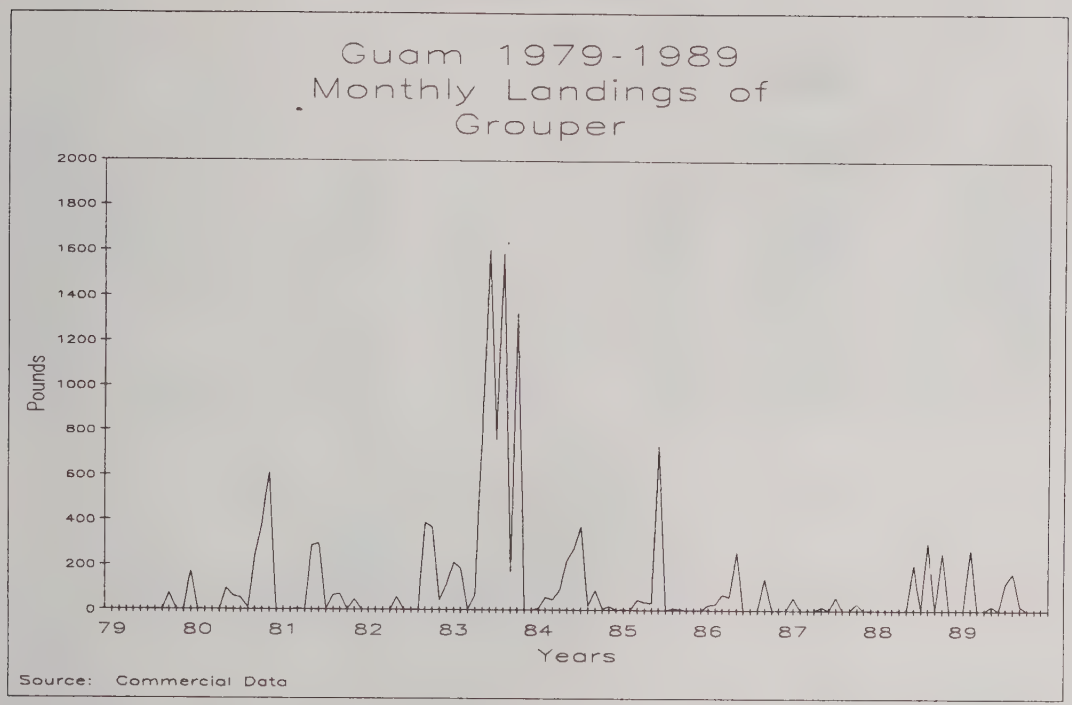

Guam 1979-1989
Monthly Landings of
Grouper
Pounds
2000
1800
1600
1400
1200
1000
800
600
400
200
0
79
80
81
82
83
84
85
86
87
88
89
Years
Source: Commercial Data

Table IV.2.1

Guam DAWR 1989 Annual
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	494464.1	11	54118.8	8	11725.3	6	191773.3	7	42628.4	7	8.6	10
Bottom fish	52618.0	18	10684.7	13	2698.4	10	27804.8	12	7286.5	9	4.8	14
Atulai jig	44896.4	30	3739.0	28	673.5	27	8417.7	28	1528.4	28	11.4	21
Spear mix	974.6	59	138.6	52	25.3	50	415.8	52	75.9	50	7.6	69*
Spear snorkel	10872.1	36	1241.6	31	415.3	31	4221.4	35	1360.5	35	8.5	29
Spear scuba	11370.4	27	816.8	28	394.8	23	2664.0	30	1246.1	25	18.8	18
Other	1749.9	37	363.8	34	127.6	28	653.7	33	235.8	28	12.9	41
Total:	616945.6	10	71103.3	7	13319.8	6	235950.7	7	46683.0	7	8.2	9

Table IV.2.2

Guam DAWR Annual 1989
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	% this trolling gear		% this bottom gear		% this other gear	
Sharks	1723.9	0.28	0	0	1583.5	3.01	140.4	0.20
Moray eels	73.6	0.01	0	0	73.6	0.14	0	0
Pike eels	58.9	0.01	0	0	58.9	0.11	0	0
Lizardfish	2.9	0	0	0	2.9	0.01	0	0
Flying fish	162.2	0.03	0	0	0	0	162.2	0.23
Needlefish	324.0	0.05	279.0	0.06	0	0	45.0	0.06
Squirrelfish	1283.7	0.21	0	0	618.6	1.18	665.1	0.95
Cornetfish	34.0	0.01	0	0	9.0	0.02	25.0	0.04
Scorpionfish	56.9	0.01	0	0	56.9	0.11	0	0
Grouper	3915.1	0.63	32.9	0.01	3513.3	6.68	368.9	0.53
Bigeyes	75.1	0.01	0	0	75.1	0.14	0	0
False whiting	27.1	0	0	0	27.1	0.05	0	0
Jacks	6888.5	1.12	1425.9	0.29	3626.4	6.89	1836.3	2.63
Rainbow runner	1788.0	0.29	1568.6	0.32	219.4	0.42	0	0
Bigeye scad (akule)	37726.9	6.12	0	0	51.6	0.10	37675.3	53.93
Dolphinfish (mahimahi)	87158.0	14.13	87158.0	17.63	0	0	0	0
Pomfret	197.1	0.03	0	0	197.1	0.37	0	0
Snappers	2224.8	0.36	88.4	0.02	1455.4	2.77	681.0	0.97
Lehi (silvermouth)	1588.0	0.26	0	0	1588.0	3.02	0	0
Uku (jobfish)	4152.1	0.67	121.0	0.02	3810.2	7.24	220.9	0.32
Ehu (pink snapper)	1305.2	0.21	0	0	1305.2	2.48	0	0
Onaga (red snapper)	635.1	0.10	0	0	635.1	1.21	0	0
Blue lined snapper	1054.8	0.17	0	0	1000.7	1.90	54.1	0.08
Yellowtail kalikali	6566.3	1.06	0	0	6566.3	12.48	0	0
Opakapaka (pink snap)	1115.5	0.18	0	0	1115.5	2.12	0	0
Yelloweye opakapaka	1008.9	0.16	0	0	1008.9	1.92	0	0
Kalikali (pink snapper)	81.3	0.01	0	0	81.3	0.15	0	0
Gindai (flower snapper)	3004.2	0.49	0	0	3004.2	5.71	0	0
Fusilier	7.4	0	0	0	0	0	7.4	0.01
Bream	7.7	0	0	0	7.7	0.01	0	0
Moharra	4.4	0	0	0	0	0	4.4	0.01
Sweetlips	1038.2	0.17	0	0	0	0	1038.2	1.49
Emperors	11561.5	1.87	7.5	0	10981.8	20.87	572.2	0.82

Table IV.2.2 (cont.)

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Goatfish	1111.8	0.18	16.5	0	464.6	0.88	630.7	0.90
Sweepers	11.9	0	0	0	9.1	0.02	2.8	0
Rudderfish	1409.5	0.23	0	0	0	0	1409.5	2.02
Batfish	16.6	0	0	0	0	0	16.6	0.02
Butterflyfish	106.1	0.02	0	0	94.2	0.18	11.9	0.02
Angelfish	51.1	0.01	0	0	0	0	51.1	0.07
Hawkfish	10.5	0	0	0	0	0	10.5	0.02
Mullet	134.5	0.02	0	0	0	0	134.5	0.19
Barracuda	13186.2	2.14	9360.7	1.89	607.3	1.15	3218.2	4.61
Wrasse	3516.6	0.57	0	0	590.4	1.12	2926.2	4.19
Parrotfish	6952.5	1.13	0	0	0	0	6952.5	9.95
Surgeonfish and tangs	4551.5	0.74	0	0	283.2	0.54	4268.3	6.11
Rabbitfish	462.0	0.07	0	0	0	0	462.0	0.66
Tunas	44.8	0.01	44.8	0.01	0	0	0	0
Wahoo	111977.4	18.15	111977.4	22.65	0	0	0	0
Kawakawa	1892.9	0.31	1892.9	0.38	0	0	0	0
Dogtooth tuna	5450.0	0.88	1832.4	0.37	1766.3	3.36	1851.4	2.65
Skipjack tuna	130682.2	21.18	130682.2	26.43	0	0	0	0
Yellowfin tuna	34403.6	5.58	34403.6	6.96	0	0	0	0
Sailfish	2190.7	0.36	2190.7	0.44	0	0	0	0
Black marlin	2141.3	0.35	2141.3	0.43	0	0	0	0
Blue marlin	109241.2	17.71	109241.2	22.09	0	0	0	0
Flounder	54.3	0.01	0	0	0	0	54.3	0.08
Triggerfish	684.7	0.11	0	0	500.4	0.95	184.3	0.26
Filefish	55.5	0.01	0	0	0	0	55.5	0.08
Tripletooth puffers	76.6	0.01	0	0	76.6	0.15	0	0
Assorted bottom fish	273.9	0.04	0	0	273.9	0.52	0	0
Shallow bottom fish	5439.9	0.88	0	0	4929.7	9.37	510.3	0.73
Deep bottom fish	132.6	0.02	0	0	132.6	0.25	0	0
Assorted reef fish	774.6	0.13	0	0	182.2	0.35	592.3	0.85
Mollusks	974.7	0.16	0	0	0	0	974.7	1.40
Cuttlefish	193.6	0.03	0	0	0	0	193.6	0.28
Squid	110.7	0.02	0	0	0	0	110.7	0.16
Octopus	287.6	0.05	0	0	34.1	0.06	253.6	0.36
Spiny lobsters	1388.4	0.23	0	0	0	0	1388.4	1.99
Slipper lobsters	23.4	0	0	0	0	0	23.4	0.03
Crabs	79.7	0.01	0	0	0	0	79.7	0.11
Total all species:	616946.3	100.00	494464.9	80.15	52618.0	8.53	69863.4	11.32

Table IV.3.1

Guam DAWR January 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	44651.1	39	5528.5	12	1154.1	13	18951.4	15	4011.6	15	7.5	41
Bottom fish	1307.6	25	393.2	30	163.6	31	1461.6	28	633.3	34	3.1	5*
Atulai jig	846.2	95	87.3	84	36.1	72	97.8	77	46.5	66	5.5	0*
Total:	46805.0	36	6009.1	12	1146.6	13	20510.7	15	4001.3	17	7.4	40

Table IV.3.2

Guam DAWR February 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	24272.4	79	3378.5	61	787.1	56	15575.6	59	3766.3	55	6.1	41*
Bottom fish	2096.6	88	297.0	88	78.5	88	678.9	88	179.3	88	7.1	0*
Spear snorkel	209.2	88	104.4	88	17.4	88	522.2	88	87.0	88	2.0	0*
Spear scuba	1871.3	88	130.6	88	52.2	88	565.8	88	226.3	88	14.3	0*
Other	215.1	88	52.2	88	8.7	88	104.4	88	17.4	88	4.1	0*
Total:	28664.6	81	3962.8	64	887.9	57	17446.9	60	4113.9	55	5.8	34*

Table IV.3.3

Guam DAWR March 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	58661.8	7	6616.7	18	1324.7	13	21619.5	19	4370.5	15	9.5	21
Bottom fish	11875.9	24	2028.9	28	520.2	20	4251.7	24	1118.5	18	5.9	13
Atulai jig	3589.4	89	109.4	89	15.6	89	218.8	89	31.3	89	32.8	0*
Spear snorkel	586.1	67	119.8	74	52.0	82	333.8	66	127.6	71	5.7	0*
Spear scuba	0	0	80.2	70	37.9	66	335.1	79	145.7	74	0	0*
Total:	74713.2	4	8954.8	13	1565.4	11	26758.8	14	5029.6	12	9.0	15

* Not enough data to properly compute Coefficient of Variation (CV).

Table IV.3.4

Guam DAWR April 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	40665.9	73	2763.5	47	610.6	46	8299.8	34	1849.2	33	12.4	11*
Bottom fish	5785.8	81	742.5	65	189.9	61	1709.1	65	433.7	61	5.7	0*
Atulai jig	1557.7	89	150.0	89	16.7	89	300.0	89	33.3	89	10.4	0*
Spear snorkel	372.0	89	16.7	89	8.3	89	100.0	89	50.0	89	22.3	0*
Other	135.9	89	68.5	89	13.7	89	137.0	89	27.4	89	2.0	0*
Total:	48517.3	71	3741.2	48	657.0	44	10545.9	38	1965.5	32	10.8	17*

Table IV.3.5

Guam DAWR May 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	29810.5	39	2723.3	41	622.6	22	9523.1	32	2298.1	11	10.8	8
Bottom fish	1379.7	46	1221.6	64	201.1	47	3346.5	70	497.6	50	4.2	93
Spear Mix	203.7	88	26.4	88	8.8	88	79.2	88	26.4	88	7.7	0*
Spear snorkel	663.6	95	113.6	76	37.9	76	227.2	76	75.7	76	3.8	0*
Spear scuba	883.1	95	41.3	95	29.1	95	123.8	95	87.2	95	21.4	0*
Total:	32940.6	36	4126.2	38	679.5	26	13299.9	28	2427.0	14	9.0	20

Table IV.3.6

Guam DAWR June 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	26886.1	24	3569.8	18	776.6	14	12592.5	19	2724.7	14	7.5	12
Bottom fish	3141.5	24	1049.3	41	219.7	19	2776.1	35	599.7	13	4.7	63
Atulai jig	4178.1	80	214.2	77	39.4	82	512.3	80	95.5	84	18.2	0*
Spear snorkel	645.1	6	100.8	34	27.7	23	403.0	34	110.9	23	7.4	48*
Spear scuba	2282.0	41	175.6	64	26.8	12	526.9	64	80.5	12	18.5	57
Other	178.5	80	68.5	56	37.7	12	144.6	54	80.5	17	2.3	90*
Total:	37311.5	24	5178.1	9	927.3	13	16955.4	11	3130.5	14	7.2	28

* Not enough data to properly compute Coefficient of Variation (CV).

Table IV.3.7

Guam DAWR July 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	41313.4	49	3517.4	17	1007.1	16	15075.7	15	4296.1	14	9.2	22
Bottom fish	8206.1	76	1402.6	46	311.5	41	3569.8	37	812.7	35	3.8	105*
Atulai jig	13694.5	46	1175.9	46	206.9	53	2869.9	43	531.3	52	14.2	111*
Spear snorkel	1232.6	75	123.5	55	42.7	39	518.1	48	182.8	31	7.9	62*
Spear scuba	395.2	91	9.1	91	12.1	91	45.5	91	60.7	91	43.4	0*
Other	938.8	68	75.2	87	26.0	66	75.2	87	26.0	66	53.0	0*
Total:	65780.8	37	6303.6	10	1341.7	7	22154.3	8	5092.4	12	10.8	30

Table IV.3.8

Guam DAWR August 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	38915.6	68	3411.7	33	556.5	36	12165.8	30	2412.3	27	8.2	86
Bottom fish	1803.3	61	393.1	53	134.3	65	1284.3	63	471.2	74	4.0	38*
Atulai jig	9060.6	60	816.2	62	153.8	55	1393.1	66	256.3	63	12.2	1*
Spear Mix	87.7	82	38.3	82	3.8	82	114.8	82	11.5	82	2.3	0*
Spear snorkel	3328.2	83	154.0	78	30.1	74	323.4	75	64.0	71	19.2	0*
Spear scuba	2014.3	75	59.3	75	34.0	69	133.0	70	79.5	65	34.0	0*
Total:	55209.8	67	3411.7	44	742.0	41	15414.4	38	2842.3	37	8.1	55

Table IV.3.9

Guam DAWR September 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	53406.0	29	4748.6	17	1233.9	11	16762.0	16	4354.1	13	10.1	8
Bottom fish	10020.7	9	1415.8	19	364.6	12	3688.5	24	1015.0	21	6.1	24
Atulai jig	8357.0	85	791.8	80	152.1	73	1877.9	77	370.4	71	7.8	0*
Spear snorkel	3830.8	65	481.6	55	190.5	44	1701.6	69	642.0	59	7.2	38*
Spear scuba	752.4	65	46.6	76	42.6	74	93.2	76	85.3	74	22.8	0*
Other	0	0	8.2	89	10.9	89	16.3	89	21.8	89	0	0*
Total:	76366.9	31	7492.6	22	1482.3	22	24139.6	22	4980.6	25	8.9	3

* Not enough data to properly compute Coefficient of Variation (CV).

Table IV.3.10

Guam DAWR October 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	27288.8	36	3810.1	11	954.3	9	13381.5	13	3330.1	9	7.0	33
Bottom fish	3392.0	42	818.9	34	224.6	31	2512.8	41	699.1	37	4.0	19
Atulai jig	2823.6	89	426.7	81	58.8	60	1097.6	83	147.1	66	3.5	141*
Spear Mix	627.1	89	49.0	89	9.8	89	147.1	89	29.4	89	12.8	0*
Spear scuba	1203.2	66	106.8	69	57.8	63	310.5	71	163.6	67	20.1	177*
Other	138.4	89	58.9	89	19.6	89	117.7	89	39.2	89	2.4	0*
Total:	35473.1	37	5270.3	13	1041.0	15	17567.1	12	3504.3	11	6.5	25

Table IV.3.11

Guam DAWR November 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	65435.4	15	7547.6	5	1451.0	6	25912.0	10	4987.2	11	8.9	18
Bottom fish	2083.2	27	580.0	22	176.1	37	1659.7	17	522.8	41	3.8	14*
Atulai jig	19.7	89	29.8	89	9.9	89	89.4	89	29.8	89	.7	0*
Spear scuba	843.5	95	51.0	95	25.5	95	153.0	95	76.5	95	16.5	0*
Other	203.8	95	25.5	95	12.8	95	51.0	95	25.5	95	8.0	0*
Total:	68585.7	13	8233.9	5	1513.0	6	27865.1	10	5077.6	11	8.6	19

Table IV.3.12

Guam DAWR December 1989
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	50568.8	27	7296.3	18	1423.2	22	24588.9	20	4798.8	23	5.8	34
Bottom fish	3410.7	41	680.1	29	220.9	10	1922.3	18	671.9	12	6.2	42*
Spear snorkel	17.5	91	12.9	91	8.6	91	25.7	91	17.1	91	1.4	0*
Spear scuba	495.8	77	74.2	66	67.4	71	242.4	66	212.7	69	6.4	0*
Total:	54492.8	28	8063.5	18	1547.5	23	26779.3	19	5235.7	25	5.7	36

* Not enough data to properly compute Coefficient of Variation (CV).

Table IV.4.1

Guam DAWR January 1989
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Squirrelfish	1.8	0	0	0	1.8	0.13	0	0
Grouper	119.6	0.26	0	0	119.6	9.14	0	0
Jacks	499.5	1.07	202.9	0.45	270.0	20.65	26.6	3.14
Rainbow runner	217.4	0.46	217.4	0.49	0	0	0	0
Bigeye scad (akule)	819.7	1.75	0	0	0	0	819.7	96.86
Dolphinfish (mahimahi)	27630.7	59.03	27630.7	61.88	0	0	0	0
Snappers	13.8	0.03	0	0	13.8	1.06	0	0
Ehu (pink snapper)	65.3	0.14	0	0	65.3	4.99	0	0
Blue lined Snapper	8.3	0.02	0	0	8.3	0.63	0	0
Yellowtail kalikali	58.8	0.13	0	0	58.8	4.49	0	0
Yelloweye opakapaka	67.8	0.14	0	0	67.8	5.19	0	0
Gindai (flower snapper)	18.8	0.04	0	0	18.8	1.44	0	0
Bream	3.0	0.01	0	0	3.0	0.23	0	0
Emperors	168.5	0.36	0	0	168.5	12.89	0	0
Goatfish	11.3	0.02	0	0	11.3	0.86	0	0
Barracuda	287.5	0.61	222.2	0.50	65.3	4.99	0	0
Surgeonfish and tangs	22.1	0.05	0	0	22.1	1.69	0	0
Wahoo	8004.2	17.10	8004.2	17.93	0	0	0	0
Kawakawa	62.8	0.13	62.8	0.14	0	0	0	0
Dogtooth Tuna	1053.6	2.25	693.2	1.55	360.4	27.56	0	0
Skipjack Tuna	5202.5	11.12	5202.5	11.65	0	0	0	0
Yellowfin Tuna	2415.3	5.16	2415.3	5.41	0	0	0	0
Triggerfish	52.7	0.11	0	0	52.7	4.03	0	0
Total all species:	46805.0	100.00	44651.1	95.40	1307.6	2.79	846.2	1.81

Table IV.4.2

Guam DAWR February 1989
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Flying fish	168.5	0.59	0	0	0	0	168.5	7.34
Squirrelfish	18.8	0.07	0	0	0	0	18.8	0.82
Cornetfish	7.5	0.03	0	0	0	0	7.5	0.33
Grouper	114.3	0.40	0	0	103.8	4.95	10.5	0.46
Jacks	251.0	0.88	0	0	26.4	1.26	224.6	9.79
Rainbow runner	329.8	1.15	329.8	1.36	0	0	0	0
Dolphinfish (mahimahi)	11751.0	40.99	11751.0	48.41	0	0	0	0
Snappers	177.3	0.62	0	0	11.6	0.55	165.7	7.22
Uku (jobfish)	140.8	0.49	0	0	140.8	6.72	0	0
Ehu (pink snapper)	24.1	0.08	0	0	24.1	1.15	0	0
Blue lined snapper	177.7	0.62	0	0	172.4	8.22	5.4	0.23
Yellowtail kalikali	36.2	0.13	0	0	36.2	1.73	0	0
Gindai (flower snapper)	67.9	0.24	0	0	67.9	3.24	0	0
Emperors	384.7	1.34	0	0	384.7	18.35	0	0
Goatfish	101.0	0.35	0	0	0	0	101.0	4.40
Batfish	17.3	0.06	0	0	0	0	17.3	0.75
Mullet	56.3	0.20	0	0	0	0	56.3	2.45
Barracuda	31.7	0.11	31.7	0.13	0	0	0	0
Wrasse	17.6	0.06	0	0	17.6	0.84	0	0
Parrotfish	186.1	0.65	0	0	0	0	186.1	8.11
Surgeonfish and tangs	54.0	0.19	0	0	25.1	1.20	28.8	1.26
Wahoo	1176.4	4.10	1176.4	4.85	0	0	0	0
Skipjack tuna	9731.2	33.95	9731.2	40.09	0	0	0	0
Yellowfin tuna	301.2	1.05	301.2	1.24	0	0	0	0
Blue marlin	951.2	3.32	951.2	3.92	0	0	0	0
Triggerfish	67.9	0.24	0	0	67.9	3.24	0	0
Shallow bottom fish	854.9	2.98	0	0	854.9	40.78	0	0
Assorted reef fish	770.1	2.69	0	0	163.1	7.78	607.0	26.44
Mollusks	429.1	1.50	0	0	0	0	429.1	18.69
Cuttlefish	174.6	0.61	0	0	0	0	174.6	7.61
Octopus	26.2	0.09	0	0	0	0	26.2	1.14
Spiny lobsters	68.2	0.24	0	0	0	0	68.2	2.97
Total all species:	28664.6	100.00	24272.4	84.68	2096.6	7.31	2295.6	8.01

Table IV.4.3

Guam DAWR March 1989
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Sharks	839.7	1.12	0	0	839.7	7.07	0	0
Needlefish	149.6	0.20	149.6	0.26	0	0	0	0
Squirrelfish	20.4	0.03	0	0	20.4	0.17	0	0
Cornetfish	14.4	0.02	0	0	14.4	0.12	0	0
Grouper	712.9	0.95	0	0	712.9	6.00	0	0
Bigeyes	13.1	0.02	0	0	13.1	0.11	0	0
Jacks	234.5	0.31	0	0	234.5	1.97	0	0
Raubbiw runner	178.6	0.24	178.6	0.30	0	0	0	0
Bigeye scad (akule)	3498.9	4.68	0	0	10.6	0.09	3488.3	83.54
Dolphinfish (mahimahi)	22607.9	30.26	22607.9	38.54	0	0	0	0
Snappers	168.5	0.23	0	0	162.9	1.37	5.7	0.14
Lehi (silvermouth)	313.8	0.42	0	0	313.8	2.64	0	0
Uku (jobfish)	1368.6	1.83	0	0	1368.6	11.52	0	0
Ehu (pink snapper)	462.3	0.62	0	0	462.3	3.89	0	0
Blue lined snapper	275.1	0.37	0	0	275.1	2.32	0	0
Yellowtail kalikali	320.6	0.43	0	0	320.6	2.70	0	0
Opakapaka (pink snap)	123.0	0.16	0	0	123.0	1.04	0	0
Yelloweye opakapaka	106.0	0.14	0	0	106.0	0.89	0	0
Gindai (flower snapper)	1124.3	1.50	0	0	1124.3	9.47	0	0
Emperors	3369.9	4.51	0	0	3369.9	28.38	0	0
Goatfish	150.6	0.20	0	0	129.0	1.09	21.6	0.52
Barracuda	1850.8	2.48	1626.7	2.77	123.0	1.04	101.1	2.42
Wrasse	43.7	0.06	0	0	43.7	0.37	0	0
Parrotfish	340.1	0.46	0	0	0	0	340.1	8.15
Surgeonfish and tangs	334.2	0.45	0	0	144.6	1.22	189.6	4.54
Rabbitfish	29.0	0.04	0	0	0	0	29.0	0.70
Wahoo	17604.6	23.56	17604.6	30.01	0	0	0	0
Dogtooth tuna	617.8	0.83	477.9	0.81	140.0	1.18	0	0
Skipjack tuna	6690.4	8.95	6690.4	11.41	0	0	0	0
Yellowfin tuna	5599.5	7.49	5599.5	9.55	0	0	0	0
Sailfish	917.2	1.23	917.2	1.56	0	0	0	0
Blue marlin	2809.4	3.76	2809.4	4.79	0	0	0	0
Triggerfish	89.1	0.12	0	0	89.1	0.75	0	0
Shallow bottom fish	1734.5	2.32	0	0	1734.5	14.61	0	0
Total all species:	74713.2	100.00	58661.8	78.52	11875.9	15.90	4175.4	5.59

Table IV.4.4

Guam DAWR April 1989
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Needlefish	55.5	0.11	55.5	0.14	0	0	0	0
Squirrelfish	201.3	0.41	0	0	200.1	3.46	1.2	0.06
Cornetfish	8.8	0.02	0	0	0	0	8.8	0.43
Grouper	369.5	0.76	0	0	348.9	6.03	20.6	1.00
Bigeyes	33.6	0.07	0	0	33.6	0.58	0	0
Jacks	369.9	0.76	0	0	292.5	5.06	77.4	3.75
Rainbow runner	70.3	0.14	70.3	0.17	0	0	0	0
Bigeye scad (akule)	559.2	1.15	0	0	0	0	559.2	27.07
Dolphinfish (mahimahi)	10720.2	22.10	10720.2	26.36	0	0	0	0
Snappers	305.9	0.63	0	0	305.9	5.29	0	0
Uku (jobfish)	368.4	0.76	0	0	368.4	6.37	0	0
Ehu (pink snapper)	168.3	0.35	0	0	168.3	2.91	0	0
Onaga (red snapper)	50.6	0.10	0	0	50.6	0.87	0	0
Blue lined snapper	29.6	0.06	0	0	25.0	0.43	4.6	0.22
Yellowtail kalikali	505.6	1.04	0	0	505.6	8.74	0	0
Opakapaka (pink snap)	433.4	0.89	0	0	433.4	7.49	0	0
Yelloweye opakapaka	363.7	0.75	0	0	363.7	6.29	0	0
Gindai (Flower snapper)	180.6	0.37	0	0	180.6	3.12	0	0
Bream	5.1	0.01	0	0	5.1	0.09	0	0
Moharra	1.2	0	0	0	0	0	1.2	0.06
Emperors	1389.2	2.86	0	0	1352.1	23.37	37.1	1.80
Goatfish	172.9	0.36	0	0	59.6	1.03	113.3	5.49
Sweepers	7.6	0.02	0	0	7.6	0.13	0	0
Rudderfish	15.1	0.03	0	0	0	0	15.1	0.73
Butterflyfish	6.8	0.01	0	0	0	0	6.8	0.33
Barracuda	1615.6	3.33	843.7	2.07	0	0	771.9	37.37
Wrasse	46.9	0.10	0	0	46.9	0.81	0	0
Parrotfish	139.6	0.29	0	0	0	0	139.6	6.76
Surgeonfish and tangs	88.1	0.18	0	0	27.1	0.47	61.0	2.95
Wahoo	3589.4	7.40	3589.4	8.83	0	0	0	0
Dogtooth tuna	755.7	1.56	220.2	0.54	429.7	7.43	105.8	5.12
Skipjack tuna	13036.6	26.87	13036.6	32.06	0	0	0	0
Yellowfin tuna	4636.6	9.56	4636.6	11.40	0	0	0	0
Sailfish	629.1	1.30	629.1	1.55	0	0	0	0
Blue marlin	6864.3	14.15	6864.3	16.88	0	0	0	0
Filefish	27.6	0.06	0	0	0	0	27.6	1.33
Shallow bottom fish	581.4	1.20	0	0	581.4	10.05	0	0
Mollusks	12.9	0.03	0	0	0	0	12.9	0.62
Spiny lobsters	79.7	0.16	0	0	0	0	79.7	3.86
Crabs	22.0	0.05	0	0	0	0	22.0	1.07
Total all species:	48517.3	100.00	40665.9	83.82	5785.8	11.93	2065.7	4.26

Table IV.4.5

Guam DAWR May 1989
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Grouper	65.0	0.20	25.6	0.09	39.4	2.86	0	0
Jacks	412.5	1.25	386.3	1.30	26.2	1.90	0	0
Dolphinfish (mahimahi)	1162.7	3.53	1162.7	3.90	0	0	0	0
Snappers	126.6	0.38	83.3	0.28	43.3	3.14	0	0
Lehi (silvermouth)	139.8	0.42	0	0	139.8	10.13	0	0
Uku (jobfish)	10.5	0.03	0	0	10.5	0.76	0	0
Ehu (pink snapper)	70.0	0.21	0	0	70.0	5.08	0	0
Yellowtail kalikali	59.5	0.18	0	0	59.5	4.31	0	0
Opakapaka (pink snap)	131.5	0.40	0	0	131.5	9.53	0	0
Yelloweye opakapaka	26.3	0.08	0	0	26.3	1.91	0	0
Kalikali (pink snapper)	10.8	0.03	0	0	10.8	0.78	0	0
Gindai (flower snapper)	139.6	0.42	0	0	139.6	10.12	0	0
Sweetlips	81.0	0.25	0	0	0	0	81.0	4.63
Emperors	188.1	0.57	14.1	0.05	174.0	12.61	0	0
Goatfish	11.1	0.03	11.1	0.04	0	0	0	0
Barracuda	218.5	0.66	218.5	0.73	0	0	0	0
Wrasse	383.9	1.17	0	0	0	0	383.9	21.93
Parrotfish	399.2	1.21	0	0	0	0	399.2	22.81
Surgeonfish and tangs	223.2	0.68	0	0	0	0	223.2	12.75
Rabbitfish	5.9	0.02	0	0	0	0	5.9	0.34
Wahoo	2425.4	7.36	2425.4	8.14	0	0	0	0
Dogtooth tuna	370.5	1.12	0	0	370.5	26.85	0	0
Skipjack tuna	12116.0	36.78	12116.0	40.64	0	0	0	0
Yellowfin tuna	3499.3	10.62	3499.3	11.74	0	0	0	0
Black marlin	2018.1	6.13	2018.1	6.77	0	0	0	0
Blue marlin	7850.2	23.83	7850.2	26.33	0	0	0	0
Shallow bottom fish	795.6	2.42	0	0	138.4	10.03	657.3	37.55
Total all species:	32940.6	100.00	29810.5	90.50	1379.7	4.19	1750.4	5.31

Table IV.4.6

Guam DAWR June 1989
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Sharks	360.7	0.97	0	0	95.5	3.04	265.2	3.64
Squirrelfish	20.4	0.05	0	0	20.4	0.65	0	0
Scorpionfish	4.9	0.01	0	0	4.9	0.16	0	0
Grouper	129.5	0.35	0	0	129.5	4.12	0	0
Bigeyes	2.3	0.01	0	0	2.3	0.07	0	0
False whiting	13.6	0.04	0	0	13.6	0.43	0	0
Jacks	1131.6	3.03	340.7	1.27	492.2	15.67	298.7	4.10
Rainbow runner	108.5	0.29	108.5	0.40	0	0	0	0
Bigeye scad (akule)	942.8	2.53	0	0	41.1	1.31	901.7	12.38
Dolphinfish (mahimahi)	208.0	0.56	208.0	0.77	0	0	0	0
Snappers	105.2	0.28	16.3	0.06	27.2	0.86	61.8	0.85
Lehi (silvermouth)	30.4	0.08	0	0	30.4	0.97	0	0
Uku (jobfish)	61.6	0.16	0	0	61.6	1.96	0	0
Ehu (pink snapper)	182.5	0.49	0	0	182.5	5.81	0	0
Blue lined snapper	55.6	0.15	0	0	55.6	1.77	0	0
Yellowtail kalikali	183.4	0.49	0	0	183.4	5.84	0	0
Opakapaka (pink snap)	11.0	0.03	0	0	11.0	0.35	0	0
Yelloweye opakapaka	72.2	0.19	0	0	72.2	2.30	0	0
Kalikali (pink snapper)	26.5	0.07	0	0	26.5	0.84	0	0
Gindai (Flower snapper)	218.0	0.58	0	0	218.0	6.94	0	0
Moharra	3.8	0.01	0	0	0	0	3.8	0.05
Emperors	483.8	1.30	0	0	459.1	14.61	24.8	0.34
Goatfish	153.6	0.41	0	0	13.6	0.43	140.1	1.92
Rudderfish	216.4	0.58	0	0	0	0	216.4	2.97
Butterflyfish	60.7	0.16	0	0	60.7	1.93	0	0
Mullet	25.2	0.07	0	0	0	0	25.2	0.35
Barracuda	2739.8	7.34	319.7	1.19	430.8	13.71	1989.4	27.31
Wrasse	428.9	1.15	0	0	43.5	1.38	385.4	5.29
Parrotfish	974.9	2.61	0	0	0	0	974.9	13.38
Surgeonfish and tangs	518.1	1.39	0	0	0	0	518.1	7.11
Rabbitfish	111.5	0.30	0	0	0	0	111.5	1.53
Tunas	20.4	0.05	20.4	0.08	0	0	0	0
Wahoo	2256.9	6.05	2256.9	8.39	0	0	0	0
Kawakawa	20.4	0.05	20.4	0.08	0	0	0	0
Dogtooth tuna	1369.0	3.67	208.0	0.77	390.5	12.43	770.4	10.58
Skipjack tuna	13837.4	37.09	13837.4	51.47	0	0	0	0
Yellowfin tuna	2446.8	6.56	2446.8	9.10	0	0	0	0
Sailfish	375.4	1.01	375.4	1.40	0	0	0	0
Blue marlin	6727.6	18.03	6727.6	25.02	0	0	0	0
Flounder	7.6	0.02	0	0	0	0	7.6	0.10
Triggerfish	69.2	0.19	0	0	69.2	2.20	0	0
Assorted bottom fish	6.4	0.02	0	0	6.4	0.20	0	0
Assorted reef fish	12.6	0.03	0	0	0	0	12.6	0.17
Spiny lobsters	560.7	1.50	0	0	0	0	560.7	7.70
Slipper lobsters	15.9	0.04	0	0	0	0	15.9	0.22
Total all species:	37311.5	100.00	26886.1	72.06	3141.5	8.42	7283.9	19.52

Table IV.4.7

Guam DAWR July 1989
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Moray eels	55.6	0.08	0	0	55.6	0.68	0	0
Pike eels	69.5	0.11	0	0	69.5	0.85	0	0
Needlefish	41.4	0.06	0	0	0	0	41.4	0.25
Squirrelfish	559.5	0.85	0	0	241.1	2.94	318.4	1.96
Grouper	389.9	0.59	0	0	377.2	4.60	12.7	0.08
Bigeyes	20.8	0.03	0	0	20.8	0.25	0	0
Jacks	877.7	1.33	0	0	543.6	6.62	334.1	2.05
Rainbow runner	387.0	0.59	314.0	0.76	72.9	0.89	0	0
Bigeye scad (akule)	12246.6	18.62	0	0	0	0	12246.6	75.31
Dolphinfish (mahimahi)	355.2	0.54	355.2	0.86	0	0	0	0
Pomfret	232.4	0.35	0	0	232.4	2.83	0	0
Snappers	346.7	0.53	0	0	155.0	1.89	191.7	1.18
Lehi (silvermouth)	705.1	1.07	0	0	705.1	8.59	0	0
Uku (jobfish)	666.8	1.01	0	0	493.1	6.01	173.7	1.07
Ehu (pink snapper)	79.9	0.12	0	0	79.9	0.97	0	0
Onaga (red snapper)	422.3	0.64	0	0	422.3	5.15	0	0
Blue lined snapper	18.8	0.03	0	0	18.8	0.23	0	0
Yellowtail kalikali	2147.1	3.26	0	0	2147.1	26.16	0	0
Opakapaka (pink snap)	303.9	0.46	0	0	303.9	3.70	0	0
Yelloweye opakapaka	81.6	0.12	0	0	81.6	0.99	0	0
Kalikali (pink snapper)	10.4	0.02	0	0	10.4	0.13	0	0
Gindai (flower snapper)	590.4	0.90	0	0	590.4	7.20	0	0
Emperors	936.1	1.42	0	0	820.4	10.00	115.8	0.71
Goatfish	133.6	0.20	0	0	68.4	0.83	65.2	0.40
Rudderfish	56.2	0.09	0	0	0	0	56.2	0.35
Butterflyfish	10.4	0.02	0	0	10.4	0.13	0	0
Angelfish	16.8	0.03	0	0	0	0	16.8	0.10
Hawkfish	3.7	0.01	0	0	0	0	3.7	0.02
Barracuda	985.2	1.50	888.3	2.15	0	0	96.9	0.60
Wrasse	278.2	0.42	0	0	59.0	0.72	219.2	1.35
Parrotfish	437.4	0.66	0	0	0	0	437.4	2.69
Surgeonfish and tangs	512.4	0.78	0	0	74.7	0.91	437.7	2.69
Wahoo	3559.1	5.41	3559.1	8.61	0	0	0	0
Dogtooth tuna	708.3	1.08	0	0	0	0	708.3	4.36
Skipjack tuna	13485.0	20.50	13485.0	32.64	0	0	0	0
Yellowfin tuna	1383.3	2.10	1383.3	3.35	0	0	0	0
Blue marlin	21328.5	32.42	21328.5	51.63	0	0	0	0
Flounder	28.9	0.04	0	0	0	0	28.9	0.18
Triggerfish	128.9	0.20	0	0	128.9	1.57	0	0
Tripletooth puffers	90.3	0.14	0	0	90.3	1.10	0	0
Assorted bottom fish	312.6	0.48	0	0	312.6	3.81	0	0
Shallow bottom fish	20.8	0.03	0	0	20.8	0.25	0	0
Mollusks	635.0	0.97	0	0	0	0	635.0	3.90
Squid	51.9	0.08	0	0	0	0	51.9	0.32
Octopus	70.0	0.11	0	0	0	0	70.0	0.43
Total all species:	65780.8	100.00	41313.4	62.80	8206.1	12.47	16261.2	24.72

Table IV.4.8

Guam DAWR August 1989
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Squirrelfish	178.9	0.32	0	0	20.3	1.12	158.6	1.09
Scorpionfish	31.4	0.06	0	0	31.4	1.74	0	0
Grouper	233.1	0.42	0	0	144.0	7.99	89.1	0.61
Jacks	200.2	0.36	0	0	14.3	0.79	185.9	1.28
Rainbow runner	83.0	0.15	83.0	0.21	0	0	0	0
Bigeye scad (akule)	9006.4	16.31	0	0	0	0	9006.4	62.15
Dolphinfish (mahimahi)	301.4	0.55	301.4	0.77	0	0	0	0
Snappers	95.5	0.17	0	0	19.8	1.10	75.7	0.52
Lehi (silvermouth)	94.8	0.17	0	0	94.8	5.26	0	0
Uku (jobfish)	273.7	0.50	0	0	181.9	10.09	91.8	0.63
Ehu (pink snapper)	2.3	0	0	0	2.3	0.13	0	0
Blue lined snapper	21.7	0.04	0	0	21.7	1.20	0	0
Yellowtail kalikali	615.4	1.11	0	0	615.4	34.12	0	0
Yelloweye opakapaka	18.6	0.03	0	0	18.6	1.03	0	0
Kalikali (pink snapper)	10.3	0.02	0	0	10.3	0.57	0	0
Gindai (flower snapper)	155.7	0.28	0	0	155.7	8.63	0	0
Sweetlips	100.9	0.18	0	0	0	0	100.9	0.70
Emperors	339.9	0.62	0	0	311.1	17.25	28.8	0.20
Goatfish	78.1	0.14	0	0	48.2	2.67	29.9	0.21
Sweepers	1.2	0	0	0	0	0	1.2	0.01
Rudderfish	767.8	1.39	0	0	0	0	767.8	5.30
Mullet	34.6	0.06	0	0	0	0	34.6	0.24
Barracuda	299.5	0.54	245.4	0.63	0	0	54.1	0.37
Wrasse	443.7	0.80	0	0	17.1	0.95	426.6	2.94
Parrotfish	2242.5	4.06	0	0	0	0	2242.5	15.48
Surgeonfish and tangs	761.9	1.38	0	0	42.9	2.38	719.1	4.96
Rabbitfish	7.5	0.01	0	0	0	0	7.5	0.05
Wahoo	2521.9	4.57	2521.9	6.48	0	0	0	0
Skipjack tuna	11385.0	20.62	11385.0	29.26	0	0	0	0
Yellowfin tuna	5256.7	9.52	5256.7	13.51	0	0	0	0
Sailfish	124.1	0.22	124.1	0.32	0	0	0	0
Blue marlin	18998.2	34.41	18998.2	48.82	0	0	0	0
Triggerfish	88.3	0.16	0	0	18.3	1.01	70.0	0.48
Squid	28.8	0.05	0	0	0	0	28.8	0.20
Octopus	106.3	0.19	0	0	35.2	1.95	71.1	0.49
Spiny lobsters	293.9	0.53	0	0	0	0	293.9	2.03
Crabs	6.2	0.01	0	0	0	0	0.02	0.04
Total all species:	55209.8	100.00	38915.6	70.49	1803.3	3.27	14490.8	26.25

Table IV.4.9

Guam DAWR September 1989
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Sharks	579.7	0.76	0	0	579.7	5.79	0	0
Moray eels	21.7	0.03	0	0	21.7	0.22	0	0
Lizardfish	1.2	0	0	0	1.2	0.01	0	0
Squirrelfish	233.4	0.31	0	0	67.0	0.67	166.3	1.29
Grouper	942.6	1.23	0	0	745.6	7.44	197.0	1.52
Bigeyes	10.9	0.01	0	0	10.9	0.11	0	0
False whiting	4.8	0.01	0	0	4.8	0.05	0	0
Jacks	853.4	1.12	149.3	0.28	538.5	5.37	165.6	1.28
Rainbow runner	109.9	0.14	0	0	109.9	1.10	0	0
Bigeye scad (akule)	8224.4	10.77	0	0	0	0	8224.4	63.56
Dolphinfish (mahimahi)	395.6	0.52	395.6	0.74	0	0	0	0
Snappers	542.1	0.71	9.9	0.02	352.0	3.51	180.2	1.39
Lehi (silvermouth)	236.7	0.31	0	0	236.7	2.36	0	0
Uku (jobfish)	872.0	1.14	0	0	872.0	8.70	0	0
Ehu (pink snapper)	58.9	0.08	0	0	58.9	0.59	0	0
Onaga (red snapper)	193.2	0.25	0	0	193.2	1.93	0	0
Blue lined snapper	46.9	0.06	0	0	40.4	0.40	6.5	0.05
Yellowtail kalikali	1258.7	1.65	0	0	1258.7	12.56	0	0
Opakapaka (pink snap)	173.9	0.23	0	0	173.9	1.74	0	0
Yelloweye opakapaka	189.3	0.25	0	0	189.3	1.89	0	0
Gindai (flower snapper)	494.9	0.65	0	0	494.9	4.94	0	0
Fusilier	12.6	0.02	0	0	0	0	12.6	0.10
Sweetlips	264.0	0.35	0	0	0	0	264.0	2.04
Emperors	2747.8	3.60	0	0	2675.6	26.70	72.2	0.56
Goatfish	104.8	0.14	0	0	17.4	0.17	87.4	0.68
Rudderfish	128.9	0.17	0	0	0	0	128.9	1.00
Angelfish	50.3	0.07	0	0	0	0	50.3	0.39
Hawkfish	11.9	0.02	0	0	0	0	11.9	0.09
Barracuda	921.9	1.21	921.9	1.73	0	0	0	0
Wrasse	902.6	1.18	0	0	28.2	0.28	874.5	6.76
Parrotfish	735.6	0.96	0	0	0	0	735.6	5.68
Surgeonfish and tangs	1554.7	2.04	0	0	0	0	1554.7	12.01
Rabbitfish	61.0	0.08	0	0	0	0	61.0	0.47
Tunas	9.5	0.01	9.5	0.02	0	0	0	0
Wahoo	5823.9	7.63	5823.9	10.90	0	0	0	0
Kawakawa	252.4	0.33	252.4	0.47	0	0	0	0
Skipjack tuna	12229.4	16.01	12229.4	22.90	0	0	0	0
Yellowfin tuna	4091.0	5.36	4091.0	7.66	0	0	0	0
Blue marlin	29523.1	38.66	29523.1	55.28	0	0	0	0
Triggerfish	56.5	0.07	0	0	56.5	0.56	0	0
Shallow bottom fish	1184.8	1.55	0	0	1184.8	11.82	0	0
Deep bottom fish	108.7	0.14	0	0	108.7	1.08	0	0
Squid	15.1	0.02	0	0	0	0	15.1	0.12
Octopus	75.4	0.10	0	0	0	0	75.4	0.58
Spiny lobsters	45.2	0.06	0	0	0	0	45.2	0.35
Crabs	11.3	0.01	0	0	0	0	11.3	0.09
Total all species:	76366.9	100.00	53406.0	69.93	10020.7	13.12	12940.1	

Table IV.4.10

Guam DAWR October 1989
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Lizardfish	1.5	0	0	0	1.5	0.04	0	0
Squirrelfish	28.7	0.08	0	0	28.7	0.85	0	0
Grouper	396.7	1.12	0	0	352.3	10.39	44.4	0.93
False whiting	2.4	0.01	0	0	2.4	0.07	0	0
Jacks	828.6	2.34	0	0	351.6	10.37	476.9	9.95
Rainbow runner	152.4	0.43	152.4	0.56	0	0	0	0
Bigeye scad (akule)	2043.7	5.76	0	0	0	0	2043.7	42.64
Dolphinfish (mahimahi)	1468.6	4.14	1468.6	5.38	0	0	0	0
Snappers	212.7	0.60	0	0	125.9	3.71	86.8	1.81
Lehi (silvermouth)	24.4	0.07	0	0	24.4	0.72	0	0
Uku (jobfish)	193.8	0.55	0	0	193.8	5.71	0	0
Ehu (pink snapper)	55.5	0.16	0	0	55.5	1.64	0	0
Blue lined snapper	200.2	0.56	0	0	175.8	5.18	24.5	0.51
Yellowtail kalikali	797.2	2.25	0	0	797.2	23.50	0	0
Yelloweye opakapaka	79.7	0.22	0	0	79.7	2.35	0	0
Kalikali (pink snapper)	12.1	0.03	0	0	12.1	0.36	0	0
Gindai (flower snapper)	114.1	0.32	0	0	114.1	3.36	0	0
Sweetlips	577.4	1.63	0	0	0	0	577.4	12.05
Emperors	813.9	2.29	0	0	743.2	21.91	70.7	1.48
Goatfish	82.7	0.23	0	0	82.7	2.44	0	0
Barracuda	895.2	2.52	867.0	3.18	0	0	28.2	0.59
Wrasse	657.9	1.85	0	0	30.8	0.91	627.1	13.09
Parrotfish	88.5	0.25	0	0	0	0	88.5	1.85
Surgeonfish and tangs	381.5	1.08	0	0	0	0	381.5	7.96
Rabbitfish	154.0	0.43	0	0	0	0	154.0	3.21
Wahoo	4992.6	14.07	4992.6	18.30	0	0	0	0
Kawakawa	541.1	1.53	541.1	1.98	0	0	0	0
Dogtooth tuna	91.2	0.26	0	0	0	0	91.2	1.90
Skipjack tuna	6280.2	17.70	6280.2	23.01	0	0	0	0
Yellowfin tuna	2943.9	8.30	2943.9	10.79	0	0	0	0
Blue marlin	10042.9	28.31	10042.9	36.80	0	0	0	0
Flounder	17.3	0.05	0	0	0	0	17.3	0.36
Triggerfish	21.8	0.06	0	0	9.1	0.27	12.7	0.27
Shallow bottom fish	211.3	0.60	0	0	211.3	6.23	0	0
Cuttlefish	26.9	0.08	0	0	0	0	26.9	0.56
Spiny lobsters	34.6	0.10	0	0	0	0	34.6	0.72
Slipper lobsters	5.8	0.02	0	0	0	0	5.8	0.12
Total all species:	35473.1	100.00	27288.8	76.93	3392.0	9.56	4792.3	13.51

Table IV.4.11

Guam DAWR November 1989
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Squirrelfish	79.9	0.12	0	0	55.7	2.68	24.1	2.26
Grouper	324.8	0.47	0	0	324.8	15.59	0	0
Bigeyes	4.2	0.01	0	0	4.2	0.20	0	0
Jacks	288.7	0.42	0	0	245.6	11.79	43.1	4.04
Rainbow runner	88.6	0.13	88.6	0.14	0	0	0	0
Dolphinfish (mahimahi)	433.2	0.63	433.2	0.66	0	0	0	0
Snappers	148.2	0.22	0	0	148.2	7.12	0	0
Uku (jobfish)	205.5	0.30	75.4	0.12	130.1	6.24	0	0
Ehu (pink snapper)	135.8	0.20	0	0	135.8	6.52	0	0
Blue lined snapper	211.6	0.31	0	0	211.6	10.16	0	0
Yellowtail kalikali	51.2	0.07	0	0	51.2	2.46	0	0
Opakapaka (pink snap)	28.3	0.04	0	0	28.3	1.36	0	0
Gindai (flower snapper)	46.7	0.07	0	0	46.7	2.24	0	0
Emperors	802.3	1.17	0	0	648.2	31.11	154.1	14.44
Goatfish	154.8	0.23	0	0	37.6	1.81	117.2	10.99
Barracuda	1385.4	2.02	1385.4	2.12	0	0	0	0
Parrotfish	422.3	0.62	0	0	0	0	422.3	39.57
Surgeonfish and tangs	132.3	0.19	0	0	7.1	0.34	125.2	11.73
Rabbitfish	181.0	0.26	0	0	0	0	181.0	16.96
Wahoo	55550.2	80.99	55550.2	84.89	0	0	0	0
Kawakawa	965.4	1.41	965.4	1.48	0	0	0	0
Skipjack tuna	6014.1	8.77	6014.1	9.19	0	0	0	0
Yellowfin tuna	923.1	1.35	923.1	1.41	0	0	0	0
Triggerfish	8.2	0.01	0	0	8.2	0.39	0	0
Total all species:	68585.7	100.00	65435.4	95.41	2083.2	3.04	1067.1	1.56

Table IV.4.12

Guam DAWR December 1989
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Needlefish	122.7	0.23	122.7	0.24	0	0	0	0
Squirrelfish	23.4	0.04	0	0	21.2	0.62	2.2	0.42
Scorpionfish	25.4	0.05	0	0	25.4	0.75	0	0
Grouper	229.3	0.42	0	0	229.3	6.72	0	0
Jacks	185.7	0.34	0	0	177.7	5.21	8.0	1.56
Dolphinfish (mahimahi)	16800.2	30.83	16800.2	33.22	0	0	0	0
Snappers	10.2	0.02	0	0	10.2	0.30	0	0
Lehi (silvermouth)	212.0	0.39	0	0	212.0	6.21	0	0
Uku (jobfish)	426.0	0.78	0	0	426.0	12.49	0	0
Ehu (pink snapper)	93.3	0.17	0	0	93.3	2.73	0	0
Blue lined snapper	24.6	0.05	0	0	24.6	0.72	0	0
Yellowtail kalikali	964.9	1.77	0	0	964.9	28.29	0	0
Yelloweye opakapaka	59.4	0.11	0	0	59.4	1.74	0	0
Gindai (flower snapper)	108.1	0.20	0	0	108.1	3.17	0	0
Sweetlips	80.6	0.15	0	0	0	0	80.6	15.71
Emperors	621.9	1.14	0	0	621.9	18.23	0	0
Barracuda	863.1	1.58	863.1	1.71	0	0	0	0
Wrasse	152.1	0.28	0	0	140.3	4.11	11.8	2.30
Parrotfish	293.3	0.54	0	0	0	0	293.3	57.15
Surgeonfish and tangs	124.6	0.23	0	0	32.8	0.96	91.8	17.88
Wahoo	19780.2	36.30	19780.2	39.12	0	0	0	0
Kawakawa	413.2	0.76	413.2	0.82	0	0	0	0
Skipjack tuna	11546.2	21.19	11546.2	22.83	0	0	0	0
Yellowfin tuna	1043.1	1.91	1043.1	2.06	0	0	0	0
Triggerfish	9.3	0.02	0	0	9.3	0.27	0	0
Shallow bottom fish	254.4	0.47	0	0	254.4	7.46	0	0
Spiny lobsters	25.5	0.05	0	0	0	0	25.5	4.97
Total all species:	54492.8	100.00	50568.8	92.80	3410.7	6.26	513.3	0.94

Table IV.5.1

1989 Guam International Fishing Derby
Summary Reports

prepared by
Guam Division of Aquatic and Wildlife Resources

Derby totals

	Day 1 Aug 18	Day 2 Aug 19	Day 3 Aug 20	Derby Totals
Number of boats	48.0	57.0	50.0	62.0
Number of fishermen	164.0	169.0	188.0	620.0
Avg. men per boat	3.4	3.0	3.8	3.4
Number of lines fished	212.0	206.0	275.0	693.0
Avg. lines per boat	4.4	3.6	5.5	3.8
Boat hours	540.1	531.0	520.0	1591.1
Fished hours	483.7	521.0	499.4	1504.1
Avg. boat trip length	9.2	8.1	8.8	8.6
Avg. time spent fishing	9.1	8.1	7.2	8.2
Fishermen hours	1847.1	1577.0	1957.1	5332.0
Line hours	2138.0	1880.8	2746.7	5682.6
Number of fish landed	257.0	171.0	143.0	571.0
Pounds landed*	7650.1	4817.3	5066.4	17533.8
Avg. catch per boat day	159.4	84.5	101.3	282.8
Avg. catch per boat hour	14.2	9.1	9.7	11.0
Avg. catch per man hour	4.1	3.1	2.6	3.3
Avg. catch per line hour	3.6	2.6	1.9	3.1

Species totals

	Day 1 - AUG 18			Day 2 - AUG 19			Day 3 - Aug 20			TOTAL		
Species	Number Caught	total wt-lbs	avg. wt.	Number Caught	total wt-lbs	avg. wt.	Number Caught	total wt-lbs	avg. wt.	Number Caught	total wt-lbs	avg. wt.
Blue marlin	38	4653.2	122.5	22	3109.0	141.3	24	3693.8	153.9	84	11456.1	136.4
Sailfish	0	0	0	1	57.6	57.7	1	66.4	66.4	2	124.1	62.0
Yellowfin tuna	36	418.0	11.6	23	240.0	10.4	22	189.6	8.6	81	848.3	10.5
Wahoo	21	443.3	21.1	25	564.7	22.6	13	285.6	22.0	59	1293.8	21.9
Mahimahi	1	4.8	4.8	5	57.0	11.4	1	19.4	19.4	7	81.2	11.6
Skipjack tuna	159	2111.8	13.3	88	740.7	8.4	68	749.1	11.0	315	3601.6	11.4
Rainbow runnner	0	0	0	4	12.9	3.2	6	19.4	3.2	10	32.3	3.2
Baracuda	2	18.9	9.4	4	35.4	8.8	8	43.1	5.4	14	97.2	6.9
Totals	257	7650.1	29.8	171	4817.3	28.2	134	5066.4	37.8	562	17533.8	31.2

* Includes incidental catch.

Table IV.6.1

Guam DAWR Annual 1989
Day Inshore Creel Survey
Expansion Summary

Methods	Prsn Cnt	CV	Gear Cnt	CV	Trip Cnt	CV	Prns Hrs	CV	Gear Hrs	CV	Catch	CV	Cpue
ok & line	34096.5	9	33529.2	9	24210.2	13	129078.0	9	126372.6	9	43973.8	4	.35
st net	6883.6	10	6444.6	10	6301.4	10	17655.0	10	16528.1	10	19884.8	10	1.20
ll net	4228.2	15	2290.2	18	2251.4	18	17784.1	15	9444.1	17	44568.9	17	4.72
rround net	143.1	74	35.8	74	35.8	74	885.9	74	221.5	74	1435.4	74	6.48
ear-snorkel	257.2	45	257.2	45	154.2	49	820.3	47	820.3	47	1152.6	47	1.41
ear-scuba	25.9	100	25.9	100	25.9	100	45.3	100	45.3	100	24.2	100	.54
ok & gaff	1233.0	63	1976.8	66	676.8	64	4346.3	66	7067.4	68	10304.9	68	1.46
ag net	13.4	100	13.4	100	13.4	100	36.2	100	36.2	100	375.0	100	10.36
her	11.7	100	11.7	100	5.9	100	42.8	100	42.8	100	182.9	100	4.27
tals	46892.6	8	44584.9	8	35831.4	8	157203.0	8	148795.4	8	121902.4	8	1.38

Table IV.6.2

Guam DAWR Annual 1989
Night Inshore Creel Survey
Expansion Summary

Methods	Prsn Cnt	CV	Gear Cnt	CV	Trip Cnt	CV	Prns Hrs	CV	Gear Hrs	CV	Catch	CV	Cpue
ok & line	9219.3	9	9607.5	9	6265.2	14	23369.6	10	24553.9	10	3309.0	5	.13
st net	40.4	74	27.0	71	26.0	71	72.9	71	56.8	77	108.3	77	1.90
ll net	1809.6	13	826.3	13	826.3	13	6896.7	13	3131.4	13	7464.5	13	2.38
rround net	0	0	0	0	0	0	0	0	0	0	0	0	0
ear-snorkel	2269.7	18	2232.3	18	1068.9	18	6862.7	18	6750.3	18	7213.0	18	1.07
ear-scuba	198.4	41	198.4	41	97.7	47	829.3	41	829.3	41	1714.9	46	1.61
ok & gaff	35.5	100	35.5	100	35.5	100	35.5	100	35.5	100	78.2	100	2.20
ag net	801.4	41	182.5	43	182.5	43	1630.9	39	353.6	39	3479.4	39	9.84
her	62.8	70	62.8	70	62.8	70	279.4	70	279.4	70	893.0	70	3.20
tals	14437.1	7	13172.2	7	9177.5	8	42785.0	7	38336.4	7	24260.3	7	1.52

Table IV.7.1

Guam DAWR 1989 Annual Day Inshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Rays	2252.2	1.85	Herring	16.3	0.01
Moray eels	450.4	0.37	Halfbeak	1725.7	1.42
Silversides	20.0	0.02	Squirrelfish	2950.3	2.42
Cornetfish	850.8	0.70	Grouper	360.9	0.30
Flagtails	9.5	0.01	Jacks	9874.7	8.10
Ponyfishes	744.1	0.61	Snappers	2167.5	1.78
Fusilier	39.7	0.03	Bream	35.0	0.03
Moharra	8083.9	6.63	Emperors	5784.6	4.75
Goatfish	21043.8	17.26	Rudderfish	4254.4	3.49
Batfish	50.0	0.04	Damselfishes	647.0	0.53
Mullet	5009.0	4.11	Threadfins	319.7	0.26
Wrasse	729.8	0.60	Parrotfish	140.9	0.12
Surgeonfish and tangs	25679.4	21.07	Rabbitfish	12068.7	9.90
Flounder	900.9	0.74	Triggerfish	1742.6	1.43
Filefish	403.4	0.33	Porcupinefish	49.2	0.04
Unidentified fish	1810.4	1.49	Mollusks	133.7	0.11
Octopus	10452.8	8.57	Crabs	1101.1	0.90
Total all species:	121902.4	100.00			

Table IV.7.2

Guam DAWR 1989 Annual
Night Inshore Creel Survey
Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Herring	592.9	2.49	Moray eels	50.9	0.21
Squirrelfish	1252.8	5.26	Grouper	213.5	0.90
Jacks	1004.1	4.21	Snappers	1324.6	5.56
Moharra	3605.7	15.13	Emperors	2237.0	9.39
Goatfish	2737.3	11.49	Rudderfish	72.4	0.30
Damselfishes	98.5	0.41	Mullet	2051.2	8.61
Wrasse	203.5	0.85	Parrotfish	22.1	0.09
Surgeonfish and tangs	4044.1	16.97	Rabbitfish	2080.5	8.73
Flounder	33.1	0.14	Porcupinefish	254.4	1.07
Unidentified fish	971.2	4.08	Mollusks	390.1	1.64
Octopus	327.0	1.37	Crabs	152.7	0.64
Total all species:	24260.3	100.00			

Table IV.7.3

Guam DAWR 1989 Annual
Combined Day And Night Inshore Creel Survey
Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Rays	2252.2	1.54	Herring	609.2	0.42
Bonefish	108.0	0.07	Moray eels	501.3	0.34
Needlefish	94.6	0.06	Halfbeak	1725.7	1.18
Silversides	20.0	0.01	Squirrelfish	4203.1	2.87
Cornetfish	850.8	0.58	Grouper	574.4	0.39
Flagtails	9.5	0.01	Jacks	10878.9	7.42
Bigeye scad (akule)	292.6	0.20	Ponyfishes	744.1	0.51
Snappers	3492.1	2.38	Fusilier	39.7	0.03
Bream	35.0	0.02	Moharra	11689.7	7.97
Emperors	8021.5	5.47	Goatfish	23781.1	16.22
Rudderfish	4326.8	2.95	Batfish	50.0	0.03
Damselfishes	745.5	0.51	Mullet	7060.2	4.82
Threadfins	319.7	0.22	Wrasse	933.3	0.64
Parrotfish	162.9	0.11	Surgeonfish and tangs	29723.5	20.28
Rabbitfish	14149.2	9.65	Flounder	933.9	0.64
Triggerfish	1742.6	1.19	Filefish	403.4	0.28
Porcupinefish	303.6	0.21	Unidentified fish	2781.7	1.90
Mollusks	523.8	0.36	Octopus	10779.8	7.35
Spiny lobsters	441.0	0.30	Slipper lobsters	37.3	0.03
Crabs	1253.7	0.86			
Total all species:	146162.7	100.00			

Table IV.7.4

Guam DAWR 1989 Annual
Combined Offshore And Inshore Creel Survey
Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Sharks	1723.9	0.26	Rays	2252.2	0.33
Herring	609.2	0.09	Bonefish	108.0	0.02
Moray eels	575.0	0.09	Pike eels	58.9	0.01
Lizardfish	2.9	0	Flying fish	162.2	0.02
Needlefish	371.3	0.05	Halfbeak	1725.7	0.26
Silversides	20.0	0	Squirrelfish	5486.8	0.81
Cornetfish	884.8	0.13	Scorpionfish	56.9	0.01
Grouper	4489.5	0.66	Flagtails	9.5	0
Bigeyes	75.1	0.01	False whiting	27.1	0
Jacks	15439.4	2.28	Jacks	2327.9	0.34
Rainbow runner	1788.0	0.26	Bigeye scad (akule)	37873.2	5.60
Dolphinfish (mahimahi)	81.2	0.01	Ponyfishes	744.1	0.11
Pomfret	197.1	0.03	Snappers	3820.1	0.57
Snappers	1896.8	0.28	Lehi (silvermouth)	1588.0	0.23
Uku (jobfish)	4152.1	0.61	Ehu (pink snapper)	1305.2	0.19
Onaga (red snapper)	635.1	0.09	Blue lined snapper	1054.8	0.16
Yellowtail kalikali	6566.3	0.97	Opakapaka (pink snap)	1115.5	0.17
Yelloweye opakapaka	1008.9	0.15	Kalikali (pink snapper)	81.3	0.01
Gindai (flower snapper)	3004.2	0.44	Fusilier	47.1	0.01
Bream	35.0	0.01	Bream	7.7	0
Moharra	11694.1	1.73	Sweetlips	1038.2	0.15
Emperors	19583.0	2.90	Goatfish	24892.9	3.68
Sweepers	11.9	0	Rudderfish	5736.3	0.85
Batfish	66.7	0.01	Butterflyfish	106.1	0.02
Angelfish	51.1	0.01	Damselfishes	745.5	0.11
Hawkfish	10.5	0	Mullet	7194.7	1.06
Barracuda	13186.2	1.95	Threadfins	319.7	0.05
Wrasse	4449.9	0.66	Parrotfish	7115.4	1.05
Surgeonfish and tangs	34274.9	5.07	Rabbitfish	14611.1	2.16
Tunas	44.8	0.01	Wahoo	111977.4	16.56
Kawakawa	1892.9	0.28	Dogtooth tuna	5450.0	0.81
Skipjack tuna	130682.2	19.33	Yellowfin tuna	34403.6	5.09
Sailfish	2190.7	0.32	Black marlin	2141.3	0.32
Blue marlin	109241.2	16.16	Flounder	988.3	0.15
Triggerfish	2427.4	0.36	Filefish	458.9	0.07
Tripletooth puffers	76.6	0.01	Porcupinefish	303.6	0.04
Assorted bottom fish	273.9	0.04	Shallow bottom fish	5439.9	0.80
Deep bottom fish	132.6	0.02	Assorted reef fish	774.6	0.11
Unidentified fish	2781.7	0.41	Mollusks	1498.5	0.22
Cuttlefish	193.6	0.03	Squid	110.7	0.02
Octopus	11067.5	1.64	Spiny lobsters	1608.9	0.24
Slipper lobsters	42.1	0.01	Crabs	1333.5	0.20
Total all species:	676032.3	100.00			

Figure IV.5.1

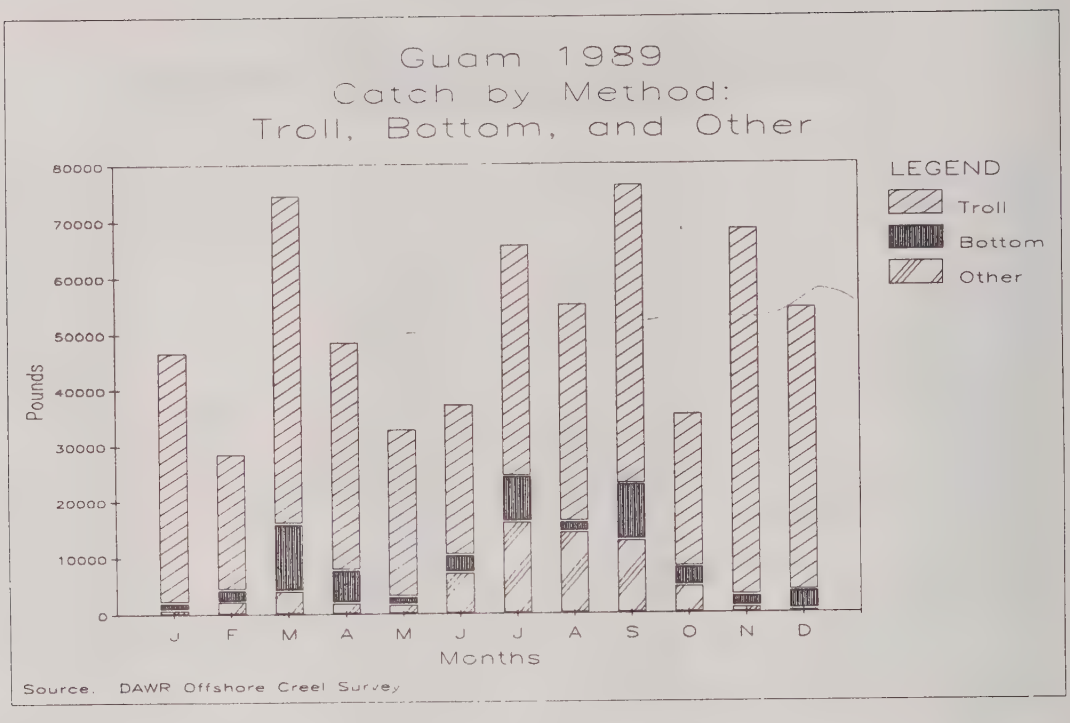


Figure IV.5.2

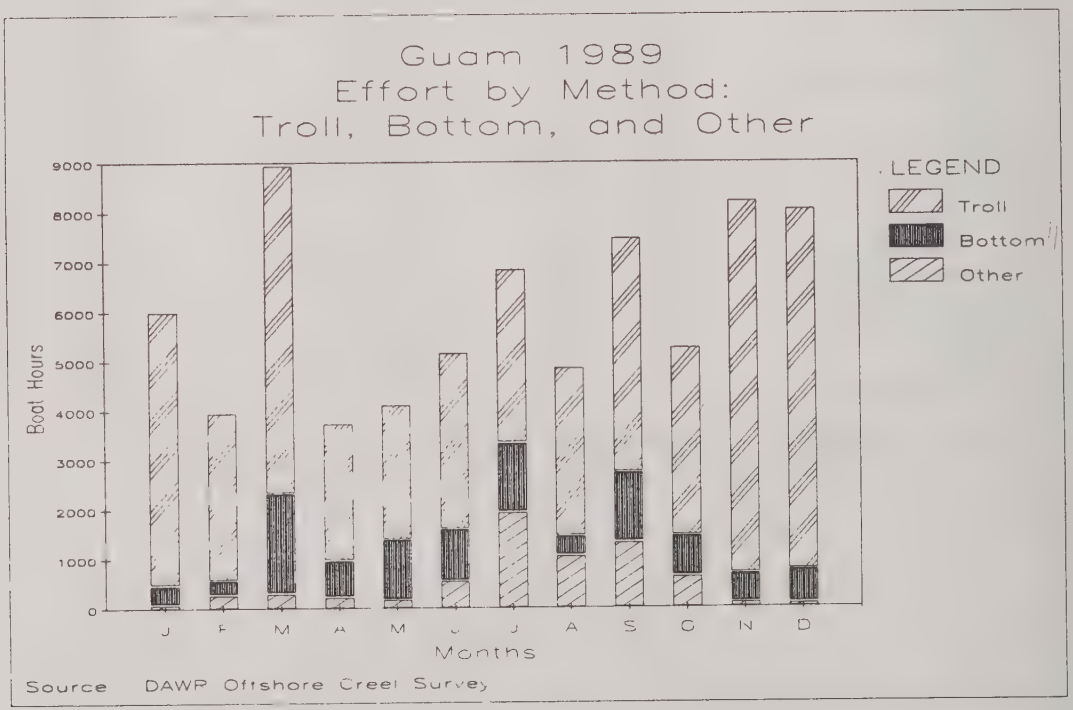


Figure IV.6.1

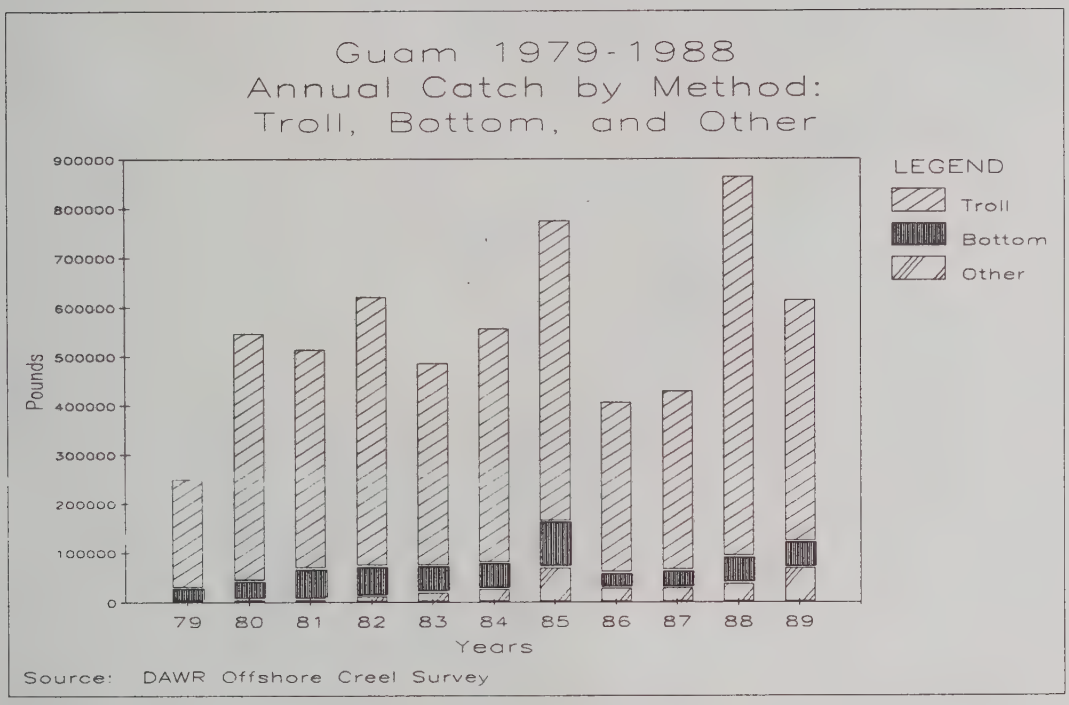


Figure IV.6.2

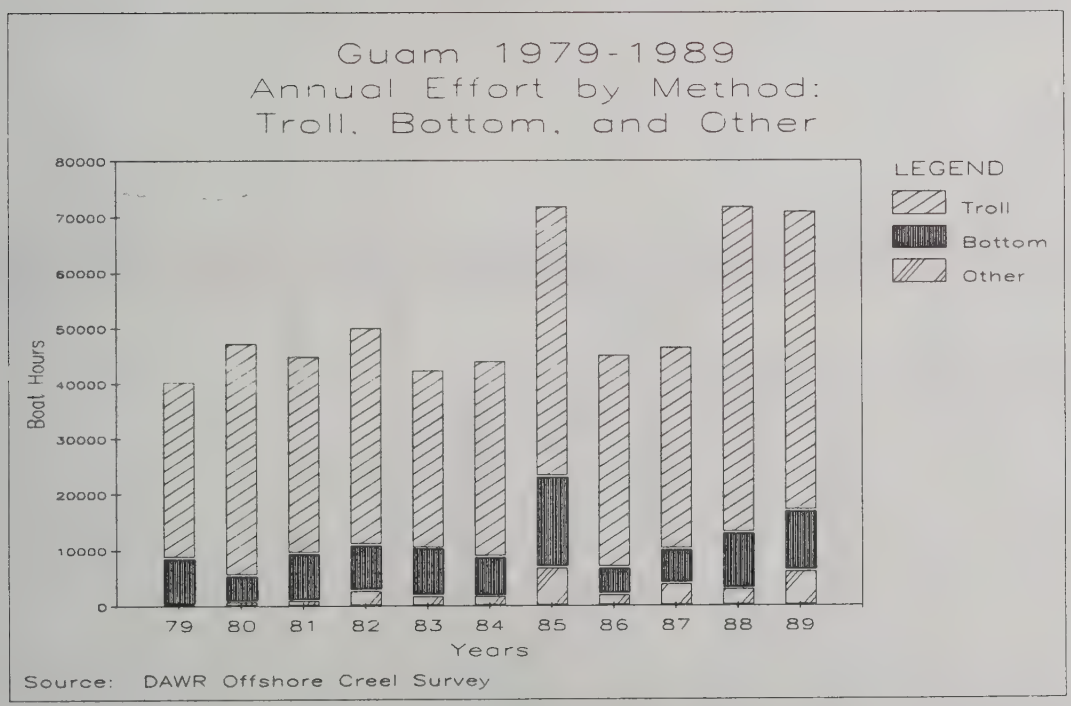


Figure IV.7.1

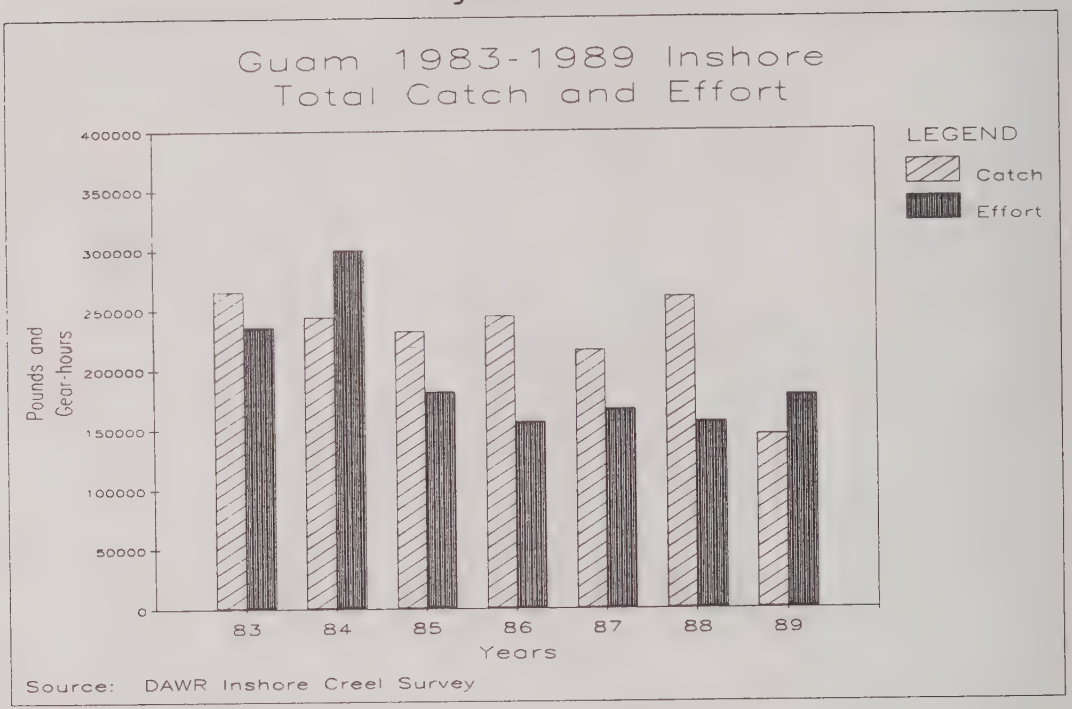
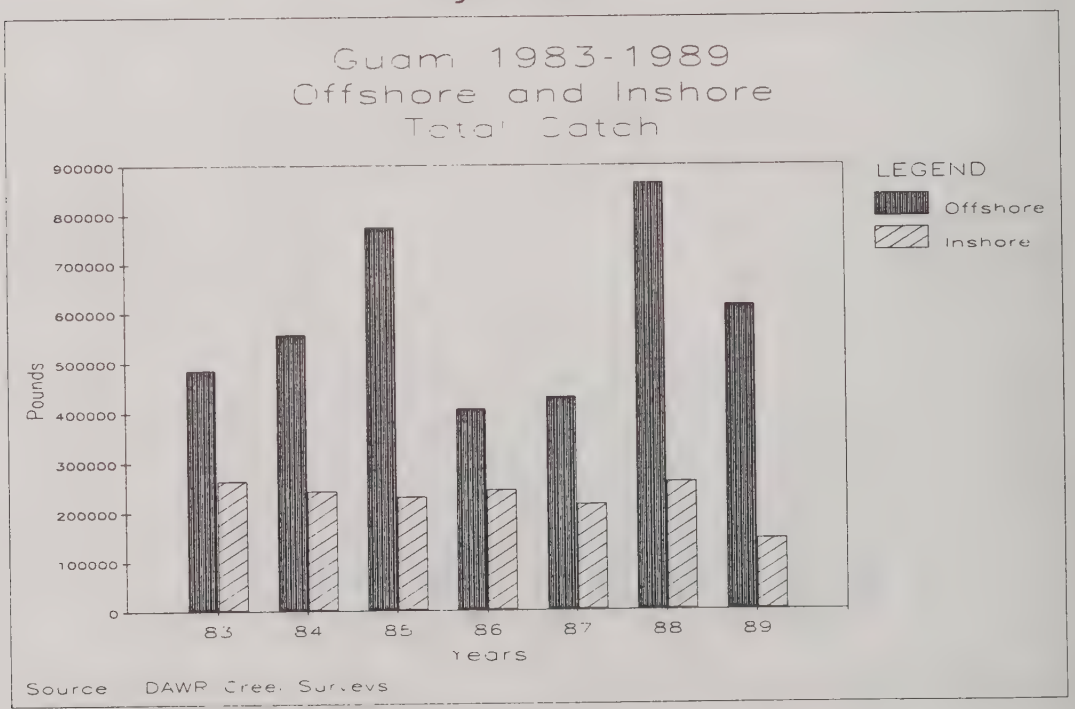


Figure IV.7.2



State of Hawaii

Fishery Statistics
1989

STATE OF HAWAII 1989 FISHERY STATISTICS

Compiled by

Division of Aquatic Resources

and the

Western Pacific Fishery Information Network

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CONTENTS

	PAGE
Introduction	V.1
Data Collecting System	V.1
Data Processing System	V.2
Data Reporting System	V.3
Tables and Figures	V.8

LIST OF HAWAII SUMMARY TABLES

Table	Title	Page
V.1.1	Hawaii 1989 Annual Commercial Landings	V.8
V.1.2	Hawaii 1989 Commercial Landings Not Sold	V.10
V.1.3	Hawaii January 1989 Commercial Landings	V.12
V.1.4	Hawaii February 1989 Commercial Landings	V.14
V.1.5	Hawaii March 1989 Commercial Landings	V.16
V.1.6	Hawaii April 1989 Commercial Landings	V.18
V.1.7	Hawaii May 1989 Commercial Landings	V.20
V.1.8	Hawaii June 1989 Commercial Landings	V.22
V.1.9	Hawaii July 1989 Commercial Landings	V.24
V.1.10	Hawaii August 1989 Commercial Landings	V.26
V.1.11	Hawaii September 1989 Commercial Landings	V.28
V.1.12	Hawaii October 1989 Commercial Landings	V.30
V.1.13	Hawaii November 1989 Commercial Landings	V.32
V.1.14	Hawaii December 1989 Commercial Landings	V.34

LIST OF HAWAII FIGURES

TABLE	TITLE	PAGE
V.1.1	Hawaii 1989 Fisheries Categories: Pelagic, Bottom, Reef, and Other	V.36
V.1.2	Hawaii 1989 Monthly Landings of Tunas, PMUS, and BMUS	V.36
V.1.3	Hawaii 1989 Monthly Landings of Wahoo, Mahimahi, and Billfish	V.37
V.1.4	Hawaii 1989 Monthly Landings of Skipjack, Yellowfin, and Other Tunas	V.37
V.2.1	Hawaii 1979-1989 Average Monthly Landings of Tunas, PMUS, and BMUS	V.38
V.2.2	Hawaii 1979-1989 Average Monthly Landings of Wahoo and Mahimahi	V.38
V.2.3	Hawaii 1979-1989 Average Monthly Landings of Marlin Species	V.39
V.2.4	Hawaii 1979-1989 Average Monthly Landings of Swordfish, Sailfish, and Spearfish	V.39
V.2.5	Hawaii 1979-1989 Average Monthly Landings of Skipjack, Yellowfin, and Other Tunas	V.40
V.2.6	Hawaii 1979-1989 Average Monthly Landings of BMUS, Onaga, and Opakapaka	V.40
V.2.7	Hawaii 1979-1989 Average Monthly Landings of BMUS, Ehu, and Uku	V.41
V.3.1	Hawaii 1979-1989 Annual Trend of Fisheries Categories Pelagic, Bottom, Reef, and Other	V.41
V.3.2	Hawaii 1979-1989 Annual Trends of Total Commercial Landings	V.42
V.3.3	Hawaii 1979-1989 Annual Trends of Tunas, PMUS, and BMUS Landings	V.42
V.3.4	Hawaii 1979-1989 Annual Trends of Wahoo, Mahimahi, and Billfish	V.43
V.3.5	Hawaii 1979-1989 Annual Trends of Skipjack, Yellowfin, and Other Tunas	V.43
V.4.1	Hawaii 1979-1989 Landings of Wahoo	V.44
V.4.2	Hawaii 1979-1989 Landings of Mahimahi	V.44
V.4.3	Hawaii 1979-1989 Landings of Blue Marlin	V.45
V.4.4	Hawaii 1979-1989 Landings of Black Marlin	V.45
V.4.5	Hawaii 1979-1989 Landings of Striped Marlin	V.46
V.4.6	Hawaii 1979-1989 Landings of Sailfish	V.46
V.4.7	Hawaii 1979-1989 Landings of Shortnose Spearfish	V.47
V.4.8	Hawaii 1979-1989 Landings of Broadbill Swordfish	V.47

LIST OF HAWAII FIGURES (cont.)

TABLE	TITLE	PAGE
V.4.9	Hawaii 1979-1989 Landings of Skipjack Tuna	V.48
V.4.10	Hawaii 1979-1989 Landings of Yellowfin Tuna	V.48
V.4.11	Hawaii 1979-1989 Landings of Onaga	V.49
V.4.12	Hawaii 1979-1989 Landings of Opakapaka	V.49
V.4.13	Hawaii 1979-1989 Landings of Ehu	V.50
V.4.14	Hawaii 1979-1989 Landings of Uku	V.50

STATE OF HAWAII 1989 FISHERY STATISTICS

INTRODUCTION

The Hawaiian Archipelago stretches northwestward over 1,500 miles, from about lat. 19° N and long. 155° W to about lat. 28° N and long. 178° W. The seven main Hawaiian Islands--Hawaii, Maui, Lanai, Molokai, Oahu, Kauai, and Niihau--comprise over 99% of the total land area and have virtually all of the State's population of approximately 1 million residents. Over half of the State's commercial fish catch is landed on Oahu and about a third on Hawaii. The Department of Land and Natural Resources' Division of Aquatic Resources (DAR) has been collecting statistics on the commercial fisheries of Hawaii for over 40 years.

The fisheries of the State of Hawaii are quite diverse and vary from hand harvesting algae to large vessel fisheries, such as longlining and lobster fishing. The major fisheries include tuna fishing using several methods, lobster trapping, hook-and-line bottom fishing for the grouper-snapper-jack complex, net fishing for such species as the bigeye scad, and trolling for such pelagic species as marlin, wahoo, and mahimahi. Of the approximately 15,000 vessels in Hawaii, about 80% are pleasure boats, 10% commercial fishing or charter boats, and the remainder are registered in other categories. The pleasure category includes boats used for recreational, subsistence, and part-time commercial fishing as well as boats not typically used for fishing such as sailboats. To fish commercially (i.e., sell catches or provide charter fishing services) in Hawaii requires purchase of a commercial marine fishing license. There are currently about 2,100 - 2,300 licensed commercial fishermen in the State. Substantial subsistence and recreational fisheries, which are primarily small boat, one-day fisheries, also exist. Data provided in this document are from licensed commercial fishermen only.

DATA COLLECTING SYSTEM

The major data collecting system used by DAR is based on a State law that requires commercial fishermen to report their catches on a monthly basis. Several different data collection forms are used because of the diversity of fishing methods and a desire to obtain specific information on some of these methods. The vast majority of commercial fishermen use the standard C-3 Fish Catch Report, which is submitted each month and requires the following information for each trip taken:

Fisherman's name and commercial license number
Boat's name and its registration number
Date
Area or buoy fished

Type of gear used
Species caught
Number caught
Pounds caught
Pounds sold
Value of sales
Port of landing

The other forms used to report commercial catches are for specific fisheries including the C-4 Aku Catch Report for the pole-and-line or bait-boat fishery for skipjack tuna, the C-5 Flagline Catch Report for the longline fishery for tunas and other pelagic species, and the Pond Operator's Monthly Fish Report for operators of saltwater fish ponds. All of the forms request basic catch and revenue information by species, plus additional fishery-specific information such as effort and bait.

Commercial collectors of tropical marine fish are required to have an aquarium permit in addition to their commercial marine license and are required to report monthly on the C-6 Aquarium Fish Catch Report. However, the aquarium fish catch is not included in the statistics provided in this document.

Some of the advantages of a mandatory fisherman-reporting system are its relative efficiency, low cost, the potential for excellent percent coverage, and the amount of information that can be collected directly from the fishermen. The major disadvantage is that it places the responsibility for accurate data recording and timely data submission on the fishermen. The assumption is made, therefore, that the data submitted by the fishermen are complete and accurate. The DAR recently made several improvements to the system and is continuing its efforts to improve the quality of data and decrease the time delays in receiving and processing the data. No real measurement is available for what percent of the total commercial catch is actually reported to DAR, but estimates have ranged from about 10% to over 99%, depending on the species and fishery. The overall percent coverage was probably over 75% in 1989.

DATA PROCESSING SYSTEM

When the various data reporting forms are received by DAR, they undergo a series of coding and editing procedures before being sent to the State's central data processing staff for keypunching. The use of central data processing staff instead of in-house fisheries personnel to accomplish most of the computer processing activities is a major and significant difference between the processing system in Hawaii and those in American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands. Forms that fail the initial editing by DAR staff are returned to the fishermen for correction and resubmission. Notices are sent to fishermen who fall more than

a few months behind in the submission of their reports. Once the data are keypunched, computer generated reports are used by DAR staff to verify and correct errors in the database. When the database is considered to be reasonably complete and error free, it is ready for production of a variety of summary catch reports.

Since this system is based on submission of data from fishermen, late reporting has always been a problem. The DAR has tried to include as much information as possible in its published monthly and annual reports. Before about 1982, statistics from fishermen's reports received after the generation of the computerized monthly summary reports were hand tallied and added to the final version of the reports before they were published. However, because of processing restrictions or complications, the original databases were not updated. Since 1982, additional editing and data correction procedures were implemented, making database updates possible. The DAR has made significant progress recently in reducing late reporting by fishermen and the time lag before data are available. Data presented in this report series for 1979-86 were based on published monthly DAR reports and differ from final annual data base total by some small percent (refer to Volumes I and III for details). Beginning with 1987, data were processed directly from the final annual detail databases from DAR.

DATA REPORTING SYSTEM

Recorded in DAR's monthly landings reports are more than 150 marine species and species groups, many of which are insignificant in the total catch. To help reduce the volume of this document and improve the usability of the tables, WPACFIN staff combined some of the less important species, reorganized the order of presentation, created a new species coding system, and translated all records in the database. The new coding system has 100 species and species groups based on flexible ecological and phylogenetic criteria. All of the commercially important pelagic and bottom fish species or unique species groups have individual codes and are reported separately. Marine pond catches are included in the species totals, but are less than 0.4% of the total landings for each year.

The monthly and annual reports included in this document contain the common name, weight in pounds, value rounded to the nearest dollar, and the average price per pound for each species. Also included are separate annual reports for commercial fishermen's landings that were not sold. Each monthly report contains a subtotal for the sum of all species for that month, and the December report contains the December subtotal and the annual total. Annual reports contain the total landings for each species and the total recorded landings for all species combined for the calendar year.

Four graphs of monthly landings are presented for 1989, and 26 trend and seasonality graphs, based on 1979-89 data, are also provided. The following species, species groups, and abbreviations are used in the tables and graphs of Hawaii's fishery statistics:

I. Pelagic Management Unit Species (PMUS)

Dolphin (mahimahi)
Wahoo
Blue marlin
Black marlin
Striped marlin
Shortbill spearfish
Sailfish
Swordfish
Sharks

II. Bottomfish Management Unit Species (BMUS)

Deep water jacks (unclassified)
Amberjack
Pig-lipped ulua (jack)
White ulua
Giant sea bass
Bluelined snapper
Ehu (red snapper)
Gindai (flower snapper)
Kalikali (pink snapper)
Lehi (silverjaw snapper)
Onaga (red or long tailed snapper)
Opakapaka (pink snapper)
Uku (gray snapper)

III. Billfish

Billfish (unclassified)
Blue marlin
Black marlin
Striped marlin
Shortbill spearfish
Sailfish
Swordfish

IV. Tunas

Tunas (unclassified)
Skipjack tuna
Yellowfin tuna
Albacore
Bigeye tuna
Kawakawa
Dogtooth tuna

V. Other Tunas

All of the previous tunas excluding skipjack and yellowfin tuna

VI. Fisheries Categories

A. Pelagics

All PMUS and tuna species plus the following:
- Rainbow runner
- Barracuda
- Japanese mackerel
- Frigate tuna
- Ocean sunfish
- Ocean moonfish

B. Bottom Fish

All BMUS plus the following:
- Blue crevally
- Dobe ulua (jack)
- Paapaa ulua
- Blue spot grouper
- Porgy

C. Reef Fish

- Reef jacks (unclassified)
- Squirrelfish
- Trumpetfish
- Scorpionfish
- Mountain bass
- Bigeyes
- Cardinalfish
- Goatfish
- Rudderfish
- Butterflyfish
- Damselfish
- Hawkfish
- Tilapia
- Wrasse
- Parrotfish
- Gobies
- Surgeonfish-tangs
- Flounders
- Triggerfish
- Filefish
- Pufferfish

D. Other

Miscellaneous
Rays
Eels
Bigeye scad (akule)
Mackerel scad (opelu)
Leatherback
Anchovy
Ten pounder
Bonefish
Herring-sardine
Milkfish
Flyingfish
Needlefish
Halfbeaks
Threadfin
Mullet
Pomfret
Snake mackerel
Freshwater fish
Spiny lobster
Slipper lobster
Crabs
Shrimp (freshwater)
Shrimp (saltwater)
Octopus
Squid
Limpets (saltwater)
Limpets (freshwater)
Clams
Stoney corals
Precious corals
Sea urchins
Sea cucumbers
Sea turtles
Algae

Table V.1.1

Hawaii 1989 Annual Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	14,591	29,552	2.03
Sharks	61,317	50,269	0.82
Eels	734	456	0.62
Alfonsin	194	442	2.28
Bigeye scad (akule)	652,575	1,150,810	1.76
Mackerel scad	376,133	608,512	1.62
Leatherback	341	422	1.24
Ten pounder	537	533	0.99
Bonefish	6,619	7,218	1.09
Herring/sardine	4	11	2.67
Milkfish	1,753	2,728	1.56
Flying fish	16	25	1.59
Needlefish	289	336	1.16
Halfbeaks	359	1,025	2.86
Threadfin	4,411	20,658	4.68
Mullet	4,998	14,081	2.82
Pomfret	14,461	25,753	1.78
Snake mackerel	11,251	4,961	0.44
Jacks (misc)	116,062	192,337	1.66
Amberjack	12,330	11,721	0.95
Blue crevally	14,666	33,660	2.30
Pig-lipped ulua	59,400	100,617	1.69
Dobe ulua	332	326	0.98
Paapaa ulua	11,314	29,579	2.61
White ulua	37,972	62,890	1.66
Black ulua	547	896	1.64
Giant sea bass	66,635	178,666	2.68
Blue spot grouper	667	1,474	2.21
Snappers	1,369	4,012	2.93
Blue lined snapper	38,194	37,211	0.97
Ehu (red snapper)	80,505	294,118	3.65
Gindai (flower snapper)	2,738	7,828	2.86
Kalekale (pink snapper)	13,292	28,728	2.16
Lehi (silverjaw)	41,223	124,357	3.02
Onaga (red snapper)	123,897	599,881	4.84
Opakapaka (pink snapper)	362,547	1,375,768	3.79
Uku (gray snapper)	207,526	666,211	3.21
Porgy	1,091	2,559	2.35
Reef jacks	332	972	2.93
Squirrelfish	23,997	65,067	2.71
Trumpetfish	79	46	0.58
Scorpionfish	3,469	11,033	3.18
Mountain bass	6,554	15,118	2.31
Bigeyes	4,744	8,107	1.71
Cardinalfish	1	2	1.90

Table V.1.1 (cont.)

Species	Pounds	Value	$/lb
Goatfish	57,279	162,959	2.85
Rudderfish	6,542	6,534	1.00
Damselfish	1,107	1,816	1.64
Hawkfish	638	979	1.53
Tilapia	1,274	4,978	3.91
Wrasse	11,552	22,127	1.92
Parrotfish	33,298	59,069	1.77
Surgeon/tangs	49,196	56,962	1.16
Flounders	9	10	1.06
Triggerfish	331	280	0.85
Filefish	362	482	1.33
Pufferfish	15	39	2.60
Rainbow runner	10,602	14,393	1.36
Mahimahi (dolphin)	459,327	1,194,356	2.60
Barracudas	86,173	28,293	0.33
Wahoo	411,121	1,151,981	2.80
Japanese mackerel	48	119	2.48
Tunas	392	836	2.13
Skipjack tuna	3,214,991	4,569,906	1.42
Yellowfin tuna	2,866,353	6,340,383	2.21
Albacore	270,968	348,051	1.28
Bigeye tuna	1,160,657	3,888,392	3.35
Kawakawa	20,294	23,431	1.15
Frigate tuna	8	15	1.88
Billfish	315	382	1.21
Broadbill swordfish	340,756	1,142,163	3.35
Blue marlin	1,017,381	900,298	0.88
Black marlin	29,788	29,841	1.00
Striped marlin	596,591	677,501	1.14
Shortnose spearfish	137,790	154,971	1.12
Sailfish	5,791	6,831	1.18
Ocean sunfish	28	11	0.41
Ocean moonfish	80,109	103,584	1.29
Spiny lobster	335,223	3,897,195	11.63
Slipper lobster	64,785	552,353	8.53
Crabs	14,475	78,457	5.42
Shrimp (freshwater)	120	600	5.00
Shrimp (saltwater)	273,627	1,129,222	4.13
Octopus	10,859	25,903	2.39
Squid	4,212	8,735	2.07
Limpets (saltwater)	8,699	25,848	2.97
Limpets (freshwater)	198	492	2.49
Precious corals	660	9,300	14.09
Sea cucumbers	51	323	6.32
Algae	9,414	35,362	3.76
** TOTAL **	13,975,479	32,426,745	

Table V.1.2

Hawaii 1989 Commercial Landings (not sold)

Species	Pounds
Miscellaneous	105
Sharks	6,986
Eels	19
Bigeye scad (akule)	71,296
Mackerel scad	11,217
Leatherback	142
Ten pounder	36
Bonefish	584
Herring/sardine	1
Milkfish	77
Needlefish	74
Halfbeaks	34
Threadfin	247
Mullet	293
Pomfret	42
Snake mackerel	130
Jacks (misc)	9,969
Amberjack	23,760
Blue crevally	583
Pig-lipped ulua	221
Dobe ulua	30
Paapaa ulua	367
White ulua	441
Giant sea bass	364
Blue spot grouper	27
Snappers	77
Blue lined snapper	4,966
Ehu (red snapper)	5,459
Gindai (flower snapper)	197
Kalekale (pink snapper)	1,320
Lehi (silverjaw)	2,108
Onaga (red snapper)	2,758
Opakapaka (pink snapper)	9,212
Uku (gray snapper)	5,235
Porgy	55
Squirrelfish	1,371
Trumpetfish	25
Scorpionfish	168
Mountain bass	575
Bigeyes	301
Cardinalfish	2
Goatfish	5,584
Rudderfish	339
Damselfish	36
Hawkfish	50
Tilapia	5
Wrasse	2,130

Table V.1.2 (cont.)

Species	Pounds
Parrotfish	1,085
Surgeon/tangs	3,212
Triggerfish	242
Filefish	149
Pufferfish	3
Rainbow runner	878
Mahimahi (dolphin)	24,893
Barracudas	1,939
Wahoo	19,332
Tunas	505
Skipjack tuna	68,078
Yellowfin tuna	57,412
Albacore	989
Bigeye tuna	1,352
Kawakawa	7,034
Frigate tuna	4
Broadbill swordfish	495
Blue marlin	85,481
Black marlin	3,371
Striped marlin	8,450
Shortnose spearfish	5,639
Sailfish	543
Ocean sunfish	11
Spiny lobster	18,425
Slipper lobster	10,738
Crabs	1,531
Shrimp (freshwater)	3
Shrimp (saltwater)	802
Octopus	2,627
Squid	916
Limpets (saltwater)	1,700
Stoney corals	700
Sea urchins	219
Algae	1,465
** TOTAL **	499,241

Table V.1.3

Hawaii January 1989 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,201	2,802	2.33
Sharks	3,917	4,577	1.17
Eels	6	2	0.30
Bigeye scad (akule)	42,285	74,723	1.77
Mackerel scad	44,092	54,453	1.23
Leatherback	12	10	0.84
Ten pounder	31	31	0.98
Bonefish	277	266	0.96
Milkfish	152	276	1.81
Needlefish	14	11	0.82
Threadfin	490	2,576	5.26
Mullet	859	2,668	3.11
Pomfret	730	1,653	2.26
Snake mackerel	221	114	0.51
Jacks (misc)	7,663	15,494	2.02
Amberjack	916	753	0.82
Blue crevally	532	1,387	2.61
Pig-lipped ulua	2,949	7,423	2.52
Dobe ulua	5	5	0.92
Paapaa ulua	1,117	3,092	2.77
White ulua	2,947	6,877	2.33
Giant sea bass	2,828	9,350	3.31
Blue spot grouper	88	172	1.95
Snappers	51	115	2.26
Blue lined snapper	1,815	1,912	1.05
Ehu (red snapper)	3,429	13,217	3.85
Gindai (flower snapper)	204	616	3.02
Kalekale (pink snapper)	1,098	2,568	2.34
Lehi (silverjaw)	3,543	11,727	3.31
Onaga (red snapper)	10,702	53,526	5.00
Opakapaka (pink snapper)	37,338	155,769	4.17
Uku (gray snapper)	24,924	91,520	3.67
Porgy	27	67	2.48
Squirrelfish	901	2,640	2.93
Scorpionfish	243	615	2.53
Mountain bass	884	2,008	2.27
Bigeyes	262	524	2.00
Goatfish	5,300	15,747	2.97
Rudderfish	669	667	1.00
Damselfish	36	69	1.91
Hawkfish	50	50	0.99
Tilapia	276	1,028	3.72

Table V.1.3 (cont.)

Species	Pounds	Value	$/lb
Wrasse	1,284	2,113	1.65
Parrotfish	2,839	4,589	1.62
Surgeon/tangs	5,968	7,236	1.21
Triggerfish	20	27	1.37
Filefish	36	56	1.56
Rainbow runner	612	866	1.41
Mahimahi (dolphin)	16,472	61,348	3.72
Barracudas	558	833	1.49
Wahoo	7,758	32,818	4.23
Tunas	11	8	0.76
Skipjack tuna	190,602	327,569	1.72
Yellowfin tuna	145,965	403,524	2.76
Albacore	2,967	6,196	2.09
Bigeye tuna	122,988	452,854	3.68
Kawakawa	1,363	1,959	1.44
Broadbill swordfish	831	3,511	4.23
Blue marlin	52,750	57,438	1.09
Black marlin	357	604	1.69
Striped marlin	48,522	69,236	1.43
Shortnose spearfish	7,386	13,555	1.84
Ocean moonfish	6,736	10,819	1.61
Spiny lobster	9,237	97,323	10.54
Slipper lobster	638	5,839	9.15
Crabs	1,012	5,175	5.11
Octopus	539	1,238	2.30
Squid	4	10	2.50
Limpets (saltwater)	423	1,390	3.29
Sea cucumbers	6	39	6.42
Algae	661	2,949	4.46
** SUBTOTAL **	833,629	2,114,218	

Table V.1.4

Hawaii February 1989 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	987	2,259	2.29
Sharks	4,118	4,721	1.15
Eels	34	21	0.63
Alfonsin	12	15	1.25
Bigeye scad (akule)	59,057	100,407	1.70
Mackerel scad	20,912	29,652	1.42
Leatherback	8	9	1.09
Ten pounder	5	4	0.83
Bonefish	586	661	1.13
Milkfish	45	93	2.06
Needlefish	37	26	0.70
Halfbeaks	84	249	2.96
Threadfin	552	2,575	4.66
Mullet	483	1,545	3.20
Pomfret	2,090	3,581	1.71
Snake mackerel	565	235	0.42
Jacks (misc)	10,520	18,837	1.79
Amberjack	2,544	2,638	1.04
Blue crevally	669	1,349	2.02
Pig-lipped ulua	6,340	9,080	1.43
Dobe ulua	6	5	0.81
Paapaa ulua	1,434	3,156	2.20
White ulua	2,026	3,667	1.81
Black ulua	44	96	2.18
Giant sea bass	3,564	11,417	3.20
Blue spot grouper	108	231	2.14
Snappers	202	335	1.66
Blue lined snapper	2,315	2,427	1.05
Ehu (red snapper)	4,704	14,262	3.03
Gindai (flower snapper)	232	595	2.56
Kalekale (pink snapper)	1,349	2,656	1.97
Lehi (silverjaw)	4,758	13,398	2.82
Onaga (red snapper)	13,946	64,055	4.59
Opakapaka (pink snapper)	40,677	131,170	3.22
Uku (gray snapper)	26,433	73,133	2.77
Porgy	67	142	2.11
Reef jacks	254	700	2.75
Squirrelfish	1,653	4,232	2.56
Scorpionfish	219	530	2.42
Mountain bass	567	1,282	2.26
Bigeyes	596	1,188	1.99
Goatfish	5,584	16,059	2.88

Table V.1.4 (cont.)

Species	Pounds	Value	$/lb
Rudderfish	784	764	0.97
Damselfish	203	298	1.47
Hawkfish	54	82	1.53
Tilapia	62	202	3.26
Wrasse	1,019	1,660	1.63
Parrotfish	3,422	5,802	1.70
Surgeon/tangs	3,979	4,370	1.10
Triggerfish	20	6	0.31
Filefish	20	34	1.70
Rainbow runner	1,131	1,568	1.39
Mahimahi (dolphin)	21,801	71,665	3.29
Barracudas	843	1,040	1.23
Wahoo	12,607	48,352	3.84
Tunas	55	84	1.52
Skipjack tuna	182,591	291,511	1.60
Yellowfin tuna	192,333	457,421	2.38
Albacore	1,830	3,855	2.11
Bigeye tuna	174,168	527,863	3.03
Kawakawa	1,091	1,212	1.11
Broadbill swordfish	1,261	4,180	3.31
Blue marlin	48,913	44,125	0.90
Black marlin	1,435	1,793	1.25
Striped marlin	60,167	73,137	1.22
Shortnose spearfish	14,081	18,097	1.29
Sailfish	29	29	1.00
Ocean sunfish	28	11	0.41
Ocean moonfish	10,597	15,736	1.48
Spiny lobster	7,626	63,981	8.39
Slipper lobster	1,352	17,725	13.11
Crabs	1,063	7,385	6.95
Octopus	466	1,196	2.57
Squid	33	47	1.43
Limpets (saltwater)	495	1,221	2.47
Limpets (freshwater)	36	75	2.08
Sea cucumbers	14	98	7.00
Algae	658	2,424	3.68
** SUBTOTAL **	966,653	2,191,739	

Table V.1.5

Hawaii March 1989 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,465	2,735	1.87
Sharks	7,023	7,274	1.04
Eels	174	88	0.51
Bigeye scad (akule)	36,642	77,181	2.11
Mackerel scad	19,054	42,833	2.25
Leatherback	27	30	1.12
Ten pounder	13	13	0.96
Bonefish	260	214	0.82
Milkfish	180	220	1.22
Needlefish	74	111	1.50
Halfbeaks	182	544	2.99
Threadfin	1,377	6,718	4.88
Mullet	452	1,320	2.92
Pomfret	1,565	3,789	2.42
Snake mackerel	1,658	448	0.27
Jacks (misc)	22,477	26,349	1.17
Amberjack	2,835	2,866	1.01
Blue crevally	774	1,970	2.55
Pig-lipped ulua	4,784	8,057	1.68
Dobe ulua	11	11	1.00
Paapaa ulua	579	1,691	2.92
White ulua	1,573	3,222	2.05
Giant sea bass	8,481	20,407	2.41
Blue spot grouper	39	88	2.25
Snappers	219	719	3.28
Blue lined snapper	5,705	5,117	0.90
Ehu (red snapper)	6,242	14,985	2.40
Gindai (flower snapper)	177	607	3.43
Kalekale (pink snapper)	1,502	2,869	1.91
Lehi (silverjaw)	4,135	12,166	2.94
Onaga (red snapper)	19,247	83,246	4.33
Opakapaka (pink snapper)	41,406	147,740	3.57
Uku (gray snapper)	17,236	59,094	3.43
Porgy	66	126	1.91
Squirrelfish	3,589	8,742	2.44
Trumpetfish	15	4	0.26
Scorpionfish	306	903	2.95
Mountain bass	1,048	2,122	2.02
Bigeyes	741	1,429	1.93
Goatfish	6,627	17,454	2.63
Rudderfish	1,065	968	0.91
Damselfish	122	225	1.85

Table V.1.5 (cont.)

Species	Pounds	Value	$/lb
Hawkfish	57	101	1.77
Tilapia	91	379	4.16
Wrasse	1,360	2,271	1.67
Parrotfish	2,982	4,837	1.62
Surgeon/tangs	8,665	9,968	1.15
Triggerfish	21	6	0.29
Filefish	21	29	1.40
Pufferfish	15	39	2.60
Rainbow runner	1,361	1,919	1.41
Mahimahi (dolphin)	56,631	139,677	2.47
Barracudas	1,413	2,277	1.61
Wahoo	27,022	90,239	3.34
Japanese mackerel	2	1	0.53
Tunas	120	376	3.14
Skipjack tuna	132,175	273,985	2.07
Yellowfin tuna	150,419	439,043	2.92
Albacore	3,993	9,891	2.48
Bigeye tuna	108,478	471,698	4.35
Kawakawa	2,524	3,072	1.22
Broadbill swordfish	18,710	76,712	4.10
Blue marlin	51,938	59,951	1.15
Black marlin	3,843	4,534	1.18
Striped marlin	47,261	79,469	1.68
Shortnose spearfish	19,690	25,065	1.27
Sailfish	58	29	0.50
Ocean moonfish	6,887	10,708	1.55
Spiny lobster	14,215	133,804	9.41
Slipper lobster	953	7,648	8.03
Crabs	1,995	14,867	7.45
Octopus	507	1,303	2.57
Squid	32	71	2.23
Limpets (saltwater)	686	2,922	4.26
Algae	805	2,336	2.90
** SUBTOTAL **	886,077	2,435,920	

Table V.1.6

Hawaii April 1989 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,526	2,762	1.81
Sharks	5,402	4,341	0.80
Eels	94	54	0.57
Alfonsin	33	91	2.75
Bigeye scad (akule)	50,790	89,750	1.77
Mackerel scad	17,796	31,509	1.77
Leatherback	2	1	0.53
Ten pounder	59	59	1.00
Bonefish	680	778	1.14
Milkfish	383	642	1.68
Needlefish	41	58	1.40
Halfbeaks	83	214	2.58
Threadfin	167	808	4.84
Mullet	209	613	2.94
Pomfret	2,187	3,765	1.72
Snake mackerel	1,172	194	0.17
Jacks (misc)	8,120	12,182	1.50
Amberjack	1,717	1,547	0.90
Blue crevally	229	665	2.90
Pig-lipped ulua	7,686	10,478	1.36
Paapaa ulua	540	1,142	2.12
White ulua	1,518	3,015	1.99
Giant sea bass	7,378	19,921	2.70
Blue spot grouper	28	85	3.03
Snappers	113	440	3.90
Blue lined snapper	2,373	2,436	1.03
Ehu (red snapper)	2,983	12,655	4.24
Gindai (flower snapper)	173	475	2.74
Kalekale (pink snapper)	920	2,320	2.52
Lehi (silverjaw)	2,017	7,611	3.77
Onaga (red snapper)	10,000	54,539	5.45
Opakapaka (pink snapper)	28,199	112,470	3.99
Uku (gray snapper)	8,822	33,416	3.79
Porgy	58	165	2.84
Squirrelfish	1,213	3,139	2.59
Scorpionfish	190	764	4.02
Mountain bass	566	1,410	2.49
Bigeyes	556	993	1.79
Goatfish	3,972	8,002	2.01
Rudderfish	555	496	0.89
Damselfish	2	2	0.75
Hawkfish	12	27	2.28

Table V.1.6 (cont.)

Species	Pounds	Value	$/lb
Tilapia	88	363	4.13
Wrasse	368	517	1.40
Parrotfish	1,890	3,229	1.71
Surgeon/tangs	3,276	4,365	1.33
Triggerfish	28	16	0.57
Filefish	26	40	1.54
Rainbow runner	394	598	1.52
Mahimahi (dolphin)	106,843	208,851	1.95
Barracudas	3,277	3,708	1.13
Wahoo	49,345	126,761	2.57
Skipjack tuna	147,024	300,278	2.04
Yellowfin tuna	126,385	339,044	2.68
Albacore	29,047	41,591	1.43
Bigeye tuna	81,272	349,395	4.30
Kawakawa	1,330	1,481	1.11
Broadbill swordfish	41,676	94,440	2.27
Blue marlin	59,727	60,779	1.02
Black marlin	5,220	6,044	1.16
Striped marlin	69,785	87,114	1.25
Shortnose spearfish	22,258	26,336	1.18
Sailfish	770	959	1.25
Ocean moonfish	9,839	13,484	1.37
Spiny lobster	34,941	436,324	12.49
Slipper lobster	4,182	39,621	9.47
Crabs	426	1,752	4.11
Shrimp (freshwater)	22	110	5.00
Shrimp (saltwater)	13,000	61,750	4.75
Octopus	540	1,213	2.25
Squid	18	63	3.50
Limpets (saltwater)	256	778	3.04
Limpets (freshwater)	26	58	2.23
Precious corals	660	9,300	14.09
Sea cucumbers	14	98	7.00
Algae	880	4,033	4.58
** SUBTOTAL **	985,397	2,650,525	

Table V.1.7

Hawaii May 1989 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	2,193	4,084	1.86
Sharks	5,019	4,566	0.91
Eels	105	88	0.84
Bigeye scad (akule)	58,312	102,443	1.76
Mackerel scad	14,860	27,245	1.83
Leatherback	3	4	1.17
Ten pounder	55	90	1.63
Bonefish	81	73	0.90
Milkfish	242	370	1.53
Flying fish	3	4	1.18
Threadfin	480	1,577	3.28
Mullet	137	333	2.43
Pomfret	1,089	1,593	1.46
Snake mackerel	971	530	0.55
Jacks (misc)	11,929	22,229	1.86
Amberjack	860	961	1.12
Blue crevally	341	912	2.67
Pig-lipped ulua	7,274	7,457	1.03
Dobe ulua	6	5	0.79
Paapaa ulua	343	830	2.42
White ulua	1,174	1,923	1.64
Black ulua	289	414	1.43
Giant sea bass	10,239	20,711	2.02
Blue spot grouper	95	149	1.57
Snappers	70	217	3.11
Blue lined snapper	2,060	2,171	1.05
Ehu (red snapper)	2,576	10,062	3.91
Gindai (flower snapper)	351	912	2.60
Kalekale (pink snapper)	494	1,129	2.29
Lehi (silverjaw)	1,038	3,103	2.99
Onaga (red snapper)	5,822	33,417	5.74
Opakapaka (pink snapper)	18,807	73,801	3.92
Uku (gray snapper)	18,765	55,656	2.97
Porgy	92	258	2.80
Squirrelfish	1,387	3,775	2.72
Scorpionfish	257	909	3.54
Mountain bass	301	732	2.43
Bigeyes	221	292	1.32
Goatfish	2,692	8,546	3.17
Rudderfish	278	300	1.08
Damselfish	152	242	1.59
Hawkfish	11	38	3.48

Table V.1.7 (cont.)

Species	Pounds	Value	$/lb
Tilapia	167	668	4.00
Wrasse	576	1,010	1.75
Parrotfish	1,859	3,193	1.72
Surgeon/tangs	3,092	3,712	1.20
Triggerfish	49	61	1.25
Filefish	52	23	0.45
Rainbow runner	729	974	1.34
Mahimahi (dolphin)	66,281	149,068	2.25
Barracudas	3,979	1,644	0.41
Wahoo	67,924	128,757	1.90
Skipjack tuna	214,142	375,971	1.76
Yellowfin tuna	206,041	483,955	2.35
Albacore	75,226	83,558	1.11
Bigeye tuna	74,835	210,478	2.81
Kawakawa	2,247	2,446	1.09
Broadbill swordfish	43,192	113,368	2.62
Blue marlin	88,815	64,549	0.73
Black marlin	3,290	2,418	0.74
Striped marlin	132,400	113,243	0.86
Shortnose spearfish	27,243	15,527	0.57
Sailfish	81	105	1.29
Ocean moonfish	7,740	9,593	1.24
Spiny lobster	44,162	581,667	13.17
Slipper lobster	7,033	69,485	9.88
Crabs	2,322	12,957	5.58
Shrimp (saltwater)	26,130	124,118	4.75
Octopus	413	982	2.38
Squid	85	255	3.00
Limpets (saltwater)	1,074	3,319	3.09
Algae	755	2,657	3.52
** SUBTOTAL **	1,273,408	2,953,909	

Table V.1.8

Hawaii June 1989 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	964	2,255	2.34
Sharks	2,870	2,414	0.84
Eels	26	34	1.31
Bigeye scad (akule)	49,943	90,903	1.82
Mackerel scad	13,766	26,213	1.90
Ten pounder	268	233	0.87
Bonefish	259	239	0.92
Milkfish	214	278	1.30
Needlefish	15	9	0.58
Threadfin	4	4	1.10
Mullet	180	425	2.36
Pomfret	827	1,356	1.64
Snake mackerel	347	166	0.48
Jacks (misc)	8,919	15,441	1.73
Amberjack	477	600	1.26
Blue crevally	4,914	9,905	2.02
Pig-lipped ulua	5,122	7,519	1.47
Dobe ulua	58	58	1.00
Paapaa ulua	2,066	5,188	2.51
White ulua	2,738	5,201	1.90
Giant sea bass	7,288	18,309	2.51
Blue spot grouper	32	79	2.48
Snappers	80	261	3.26
Blue lined snapper	2,427	2,267	0.93
Ehu (red snapper)	3,732	14,833	3.97
Gindai (flower snapper)	123	435	3.53
Kalekale (pink snapper)	459	1,135	2.47
Lehi (silverjaw)	1,183	3,427	2.90
Onaga (red snapper)	7,590	40,067	5.28
Opakapaka (pink snapper)	22,555	95,572	4.24
Uku (gray snapper)	23,313	66,273	2.84
Porgy	97	208	2.14
Squirrelfish	1,133	2,820	2.49
Scorpionfish	252	707	2.81
Mountain bass	418	1,086	2.60
Bigeyes	266	359	1.35
Goatfish	4,911	11,952	2.43
Rudderfish	467	554	1.19
Damselfish	74	122	1.65
Hawkfish	65	99	1.52
Tilapia	141	584	4.14
Wrasse	636	868	1.36

Table V.1.8 (cont.)

Species	Pounds	Value	$/lb
Parrotfish	3,026	5,037	1.66
Surgeon/tangs	3,819	4,212	1.10
Triggerfish	15	23	1.50
Filefish	12	17	1.44
Rainbow runner	673	959	1.42
Mahimahi (dolphin)	22,464	78,142	3.48
Barracudas	6,629	3,420	0.52
Wahoo	54,603	132,434	2.43
Tunas	48	44	0.91
Skipjack tuna	401,659	428,240	1.07
Yellowfin tuna	500,763	896,462	1.79
Albacore	47,172	48,436	1.03
Bigeye tuna	41,438	119,799	2.89
Kawakawa	2,214	2,847	1.29
Billfish	25	50	2.00
Broadbill swordfish	64,324	204,439	3.18
Blue marlin	102,073	77,468	0.76
Black marlin	5,448	5,141	0.94
Striped marlin	88,795	73,668	0.83
Shortnose spearfish	13,994	15,521	1.11
Sailfish	769	825	1.07
Ocean moonfish	6,470	8,031	1.24
Spiny lobster	38,938	464,695	11.93
Slipper lobster	13,022	122,351	9.40
Crabs	278	899	3.23
Shrimp (freshwater)	41	205	5.00
Shrimp (saltwater)	18,080	85,880	4.75
Octopus	629	1,236	1.96
Squid	116	345	2.97
Limpets (saltwater)	819	2,460	3.00
Limpets (freshwater)	26	62	2.40
Algae	929	3,505	3.77
** SUBTOTAL **	1,610,530	3,217,308	

Table V.1.9

Hawaii July 1989 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	953	2,069	2.17
Sharks	4,611	3,469	0.75
Eels	16	24	1.50
Alfonsin	7	9	1.31
Bigeye scad (akule)	50,803	100,858	1.99
Mackerel scad	27,826	50,963	1.83
Leatherback	8	11	1.38
Ten pounder	36	36	0.99
Bonefish	854	709	0.83
Milkfish	215	367	1.71
Flying fish	10	20	1.97
Needlefish	50	50	1.00
Threadfin	1	0	0.25
Mullet	451	1,102	2.44
Pomfret	92	200	2.18
Snake mackerel	244	131	0.53
Jacks (misc)	3,948	7,365	1.87
Amberjack	80	148	1.85
Blue crevally	1,629	4,473	2.75
Pig-lipped ulua	2,217	4,674	2.11
Dobe ulua	4	5	1.15
Paapaa ulua	700	2,158	3.08
White ulua	2,870	5,055	1.76
Giant sea bass	3,002	8,730	2.91
Blue spot grouper	81	196	2.41
Snappers	71	273	3.84
Blue lined snapper	3,211	2,936	0.91
Ehu (red snapper)	989	4,912	4.97
Gindai (flower snapper)	53	218	4.11
Kalekale (pink snapper)	234	816	3.49
Lehi (silverjaw)	614	2,182	3.55
Onaga (red snapper)	2,134	13,567	6.36
Opakapaka (pink snapper)	16,848	77,205	4.58
Uku (gray snapper)	15,913	61,981	3.89
Porgy	15	28	1.89
Squirrelfish	1,449	4,937	3.41
Trumpetfish	10	8	0.77
Scorpionfish	150	500	3.33
Mountain bass	201	576	2.86
Bigeyes	203	318	1.57
Goatfish	3,445	8,695	2.52
Rudderfish	551	628	1.14

Table V.1.9 (cont.)

Species	Pounds	Value	$/lb
Damselfish	41	85	2.08
Hawkfish	29	48	1.67
Tilapia	87	457	5.26
Wrasse	256	367	1.43
Parrotfish	2,813	4,888	1.74
Surgeon/tangs	3,189	3,717	1.17
Triggerfish	16	26	1.62
Filefish	26	27	1.02
Rainbow runner	943	1,566	1.66
Mahimahi (dolphin)	15,323	58,904	3.84
Barracudas	2,717	3,197	1.18
Wahoo	40,108	113,081	2.82
Japanese mackerel	8	4	0.50
Skipjack tuna	519,960	584,894	1.12
Yellowfin tuna	500,416	949,481	1.90
Albacore	23,286	29,308	1.26
Bigeye tuna	13,788	35,844	2.60
Kawakawa	926	962	1.04
Broadbill swordfish	62,129	227,025	3.65
Blue marlin	90,340	77,516	0.86
Black marlin	936	981	1.05
Striped marlin	14,377	23,320	1.62
Shortnose spearfish	3,843	5,517	1.44
Sailfish	581	711	1.22
Ocean moonfish	1,102	1,740	1.58
Spiny lobster	38,889	439,494	11.30
Slipper lobster	7,525	64,071	8.51
Crabs	259	977	3.77
Shrimp (saltwater)	42,429	20,154	0.47
Octopus	473	1,342	2.84
Squid	91	270	2.97
Limpets (saltwater)	860	2,457	2.86
Algae	1,281	4,781	3.73
** SUBTOTAL **	1,535,846	3,029,810	

Table V.1.10

Hawaii August 1989 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,595	2,803	1.76
Sharks	3,509	3,146	0.90
Eels	76	40	0.53
Alfonsin	6	11	1.83
Bigeye scad (akule)	83,835	155,847	1.86
Mackerel scad	35,451	64,473	1.82
Leatherback	7	7	1.00
Ten pounder	3	2	0.67
Bonefish	1,406	1,688	1.20
Flying fish	1	1	1.00
Threadfin	3	6	1.92
Mullet	286	662	2.31
Pomfret	1,176	2,098	1.78
Snake mackerel	838	423	0.50
Jacks (misc)	11,083	20,201	1.82
Amberjack	204	155	0.76
Blue crevally	2,335	5,152	2.21
Pig-lipped ulua	5,102	7,662	1.50
Dobe ulua	5	6	1.20
Paapaa ulua	1,095	3,177	2.90
White ulua	6,824	11,260	1.65
Giant sea bass	5,069	14,278	2.82
Blue spot grouper	7	24	3.37
Snappers	135	399	2.95
Blue lined snapper	3,802	3,713	0.98
Ehu (red snapper)	3,297	13,775	4.18
Gindai (flower snapper)	183	557	3.04
Kalekale (pink snapper)	592	1,409	2.38
Lehi (silverjaw)	3,017	10,011	3.32
Onaga (red snapper)	12,018	61,301	5.10
Opakapaka (pink snapper)	21,324	96,347	4.52
Uku (gray snapper)	24,925	80,302	3.22
Porgy	229	545	2.38
Squirrelfish	2,853	8,037	2.82
Trumpetfish	9	3	0.37
Scorpionfish	290	925	3.19
Mountain bass	763	1,856	2.43
Bigeyes	509	805	1.58
Cardinalfish	1	2	1.90
Goatfish	4,618	13,834	3.00
Rudderfish	592	623	1.05
Damselfish	69	110	1.59

Table V.1.10 (cont.)

Species	Pounds	Value	$/lb
Hawkfish	88	132	1.50
Tilapia	15	66	4.42
Wrasse	1,430	3,824	2.67
Parrotfish	3,784	6,928	1.83
Surgeon/tangs	4,550	5,225	1.15
Flounders	2	2	0.94
Triggerfish	34	4	0.12
Filefish	38	22	0.57
Rainbow runner	1,206	1,413	1.17
Mahimahi (dolphin)	13,723	56,623	4.13
Barracudas	2,845	3,577	1.26
Wahoo	42,967	134,902	3.14
Tunas	91	258	2.84
Skipjack tuna	382,437	503,730	1.32
Yellowfin tuna	385,644	797,734	2.07
Albacore	24,031	33,302	1.39
Bigeye tuna	22,273	73,870	3.32
Kawakawa	1,228	1,424	1.16
Broadbill swordfish	19,504	57,605	2.95
Blue marlin	116,321	108,440	0.93
Black marlin	477	239	0.50
Striped marlin	4,008	7,709	1.92
Shortnose spearfish	3,200	5,907	1.85
Sailfish	2,170	2,401	1.11
Ocean moonfish	3,856	5,640	1.46
Spiny lobster	57,199	691,380	12.09
Slipper lobster	6,618	51,741	7.82
Crabs	816	3,166	3.88
Shrimp (saltwater)	21,750	103,313	4.75
Octopus	891	1,929	2.17
Squid	233	537	2.30
Limpets (saltwater)	869	2,454	2.82
Sea cucumbers	8	56	7.00
Algae	975	3,667	3.76
** SUBTOTAL **	1,364,423	3,256,892	

Table V.1.11

Hawaii September 1989 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	760	1,776	2.34
Sharks	2,932	2,501	0.85
Eels	128	71	0.56
Alfonsin	88	220	2.50
Bigeye scad (akule)	49,146	93,471	1.90
Mackerel scad	53,014	84,748	1.60
Leatherback	104	125	1.20
Ten pounder	2	2	1.00
Bonefish	1,000	1,220	1.22
Milkfish	135	173	1.28
Needlefish	30	42	1.40
Halfbeaks	4	8	1.88
Threadfin	368	1,822	4.95
Mullet	519	1,147	2.21
Pomfret	591	938	1.59
Snake mackerel	568	399	0.70
Jacks (misc)	9,669	17,492	1.81
Amberjack	129	87	0.68
Blue crevally	627	2,000	3.19
Pig-lipped ulua	3,527	6,899	1.96
Paapaa ulua	1,325	4,428	3.34
White ulua	4,694	6,792	1.45
Giant sea bass	5,373	15,772	2.94
Blue spot grouper	22	58	2.63
Snappers	77	163	2.11
Blue lined snapper	4,051	4,512	1.11
Ehu (red snapper)	3,328	10,153	3.05
Gindai (flower snapper)	180	603	3.35
Kalekale (pink snapper)	838	1,931	2.30
Lehi (silverjaw)	7,973	23,930	3.00
Onaga (red snapper)	7,751	44,467	5.74
Opakapaka (pink snapper)	26,575	109,267	4.11
Uku (gray snapper)	14,207	44,412	3.13
Porgy	96	241	2.51
Reef jacks	30	90	3.00
Squirrelfish	2,991	8,798	2.94
Trumpetfish	5	3	0.50
Scorpionfish	275	761	2.77
Mountain bass	585	1,452	2.48
Bigeyes	396	623	1.57
Goatfish	4,902	14,905	3.04
Rudderfish	510	466	0.91

Table V.1.11 (cont.)

Species	Pounds	Value	$/lb
Damselfish	191	330	1.73
Hawkfish	77	93	1.20
Tilapia	97	241	2.48
Wrasse	1,050	1,917	1.83
Parrotfish	1,999	4,003	2.00
Surgeon/tangs	3,500	4,082	1.17
Flounders	3	1	0.21
Triggerfish	32	38	1.17
Filefish	10	10	0.95
Rainbow runner	1,795	2,188	1.22
Mahimahi (dolphin)	23,190	81,792	3.53
Barracudas	60,677	3,199	0.05
Wahoo	26,499	82,041	3.10
Tunas	40	43	1.09
Skipjack tuna	327,555	430,804	1.32
Yellowfin tuna	197,053	451,827	2.29
Albacore	14,912	22,807	1.53
Bigeye tuna	47,915	155,670	3.25
Kawakawa	1,251	1,175	0.94
Broadbill swordfish	3,278	9,028	2.75
Blue marlin	110,445	109,112	0.99
Black marlin	1,691	1,807	1.07
Striped marlin	5,207	9,345	1.79
Shortnose spearfish	3,481	6,428	1.85
Sailfish	678	1,079	1.59
Ocean moonfish	3,010	4,383	1.46
Spiny lobster	46,584	548,480	11.77
Slipper lobster	5,059	40,406	7.99
Crabs	1,109	3,963	3.57
Shrimp (saltwater)	43,750	207,813	4.75
Octopus	1,968	4,908	2.49
Squid	770	1,559	2.02
Limpets (saltwater)	790	2,259	2.86
Algae	735	2,525	3.44
** SUBTOTAL **	1,145,926	2,704,320	

Table V.1.12

Hawaii October 1989 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,046	1,924	1.84
Sharks	7,521	4,445	0.59
Eels	18	9	0.50
Alfonsin	3	6	2.00
Bigeye scad (akule)	42,385	74,672	1.76
Mackerel scad	50,128	78,775	1.57
Leatherback	135	191	1.42
Ten pounder	31	31	0.98
Bonefish	97	110	1.13
Herring/sardine	4	11	2.67
Milkfish	161	277	1.72
Flying fish	2	1	0.60
Needlefish	14	15	1.06
Halfbeaks	6	11	1.83
Threadfin	252	1,151	4.57
Mullet	590	1,733	2.94
Pomfret	1,125	1,723	1.53
Snake mackerel	876	751	0.86
Jacks (misc)	7,095	12,124	1.71
Amberjack	347	165	0.47
Blue crevally	1,328	3,035	2.29
Pig-lipped ulua	6,581	14,403	2.19
Dobe ulua	37	30	0.80
Paapaa ulua	1,492	2,931	1.96
White ulua	3,660	5,293	1.45
Black ulua	69	164	2.38
Giant sea bass	4,747	15,000	3.16
Blue spot grouper	79	211	2.67
Snappers	153	524	3.42
Blue lined snapper	3,848	3,729	0.97
Ehu (red snapper)	4,438	12,238	2.76
Gindai (flower snapper)	282	924	3.28
Kalekale (pink snapper)	1,351	2,666	1.97
Lehi (silverjaw)	5,259	14,903	2.83
Onaga (red snapper)	16,741	73,740	4.40
Opakapaka (pink snapper)	34,196	118,459	3.46
Uku (gray snapper)	12,007	36,851	3.07
Porgy	98	235	2.40
Reef jacks	40	158	3.95
Squirrelfish	2,414	6,618	2.74
Trumpetfish	9	3	0.35
Scorpionfish	302	995	3.30

Table V.1.12 (cont.)

Species	Pounds	Value	$/lb
Mountain bass	460	1,113	2.42
Bigeyes	565	896	1.59
Goatfish	5,908	18,669	3.16
Rudderfish	284	280	0.99
Damselfish	164	273	1.66
Hawkfish	70	109	1.55
Tilapia	85	319	3.75
Wrasse	1,267	2,063	1.63
Parrotfish	3,046	5,565	1.83
Surgeon/tangs	3,210	3,959	1.23
Flounders	4	7	1.75
Triggerfish	66	66	1.00
Filefish	44	74	1.69
Rainbow runner	829	1,030	1.24
Mahimahi (dolphin)	44,282	110,380	2.49
Barracudas	999	1,369	1.37
Wahoo	37,297	116,156	3.11
Japanese mackerel	38	114	3.00
Tunas	19	12	0.62
Skipjack tuna	254,967	374,242	1.47
Yellowfin tuna	155,104	377,394	2.43
Albacore	31,180	42,176	1.35
Bigeye tuna	122,060	375,155	3.07
Kawakawa	1,780	1,871	1.05
Frigate tuna	8	15	1.88
Broadbill swordfish	21,644	93,509	4.32
Blue marlin	134,521	105,138	0.78
Black marlin	1,026	821	0.80
Striped marlin	21,397	29,723	1.39
Shortnose spearfish	3,899	5,922	1.52
Sailfish	274	357	1.30
Ocean moonfish	6,191	6,494	1.05
Spiny lobster	11,537	127,412	11.04
Slipper lobster	2,763	22,518	8.15
Crabs	1,111	3,972	3.57
Shrimp (saltwater)	43,816	213,580	4.87
Octopus	1,660	3,715	2.24
Squid	1,162	2,077	1.79
Limpets (saltwater)	468	1,252	2.67
Limpets (freshwater)	31	77	2.48
Algae	695	2,246	3.23
** SUBTOTAL **	1,126,894	2,543,347	

Table V.1.13

Hawaii November 1989 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	972	2,189	2.25
Sharks	4,548	3,858	0.85
Eels	51	23	0.45
Alfonsin	45	90	2.00
Bigeye scad (akule)	77,726	109,174	1.40
Mackerel scad	49,893	72,177	1.45
Leatherback	16	16	0.98
Bonefish	670	790	1.18
Milkfish	26	33	1.25
Needlefish	11	12	1.05
Threadfin	394	1,916	4.86
Mullet	505	1,508	2.99
Pomfret	1,546	2,912	1.88
Snake mackerel	1,764	994	0.56
Jacks (misc)	5,500	8,851	1.61
Amberjack	923	759	0.82
Blue crevally	430	1,141	2.65
Pig-lipped ulua	3,273	9,389	2.87
Dobe ulua	5	4	0.72
Paapaa ulua	623	1,786	2.87
White ulua	2,138	3,611	1.69
Black ulua	145	222	1.53
Giant sea bass	2,555	7,825	3.06
Blue spot grouper	49	98	1.99
Snappers	65	132	2.03
Blue lined snapper	2,872	2,584	0.90
Ehu (red snapper)	3,556	11,268	3.17
Gindai (flower snapper)	173	531	3.07
Kalekale (pink snapper)	1,222	2,747	2.25
Lehi (silverjaw)	3,304	9,715	2.94
Onaga (red snapper)	17,946	77,956	4.34
Opakapaka (pink snapper)	24,923	93,868	3.77
Uku (gray snapper)	8,422	27,889	3.31
Porgy	196	451	2.30
Reef jacks	8	25	3.09
Squirrelfish	2,316	5,770	2.49
Trumpetfish	15	8	0.56
Scorpionfish	380	1,426	3.75
Mountain bass	423	870	2.06
Bigeyes	201	375	1.87
Goatfish	4,117	13,065	3.17
Rudderfish	349	357	1.02

Table V.1.13 (cont.)

Species	Pounds	Value	$/lb
Damselfish	18	23	1.28
Hawkfish	58	89	1.54
Tilapia	48	240	4.99
Wrasse	1,224	2,983	2.44
Parrotfish	3,094	5,764	1.86
Surgeon/tangs	2,647	2,866	1.08
Triggerfish	4	0	0.09
Filefish	13	25	1.92
Rainbow runner	751	1,081	1.44
Mahimahi (dolphin)	49,201	119,965	2.44
Barracudas	1,051	1,393	1.33
Wahoo	23,219	75,039	3.23
Skipjack tuna	256,772	331,186	1.29
Yellowfin tuna	156,648	352,237	2.25
Albacore	12,944	19,516	1.51
Bigeye tuna	159,394	419,498	2.63
Kawakawa	1,797	1,851	1.03
Billfish	185	111	0.60
Broadbill swordfish	35,799	128,798	3.60
Blue marlin	85,889	69,171	0.81
Black marlin	4,845	4,546	0.94
Striped marlin	45,292	45,695	1.01
Shortnose spearfish	8,199	9,937	1.21
Sailfish	321	238	0.74
Ocean moonfish	8,349	8,744	1.05
Spiny lobster	21,518	214,309	9.96
Slipper lobster	9,102	70,642	7.76
Crabs	1,360	6,431	4.73
Shrimp (saltwater)	48,276	234,765	4.86
Octopus	1,698	3,977	2.34
Squid	1,252	2,504	2.00
Limpets (saltwater)	1,067	2,886	2.70
Algae	605	2,609	4.31
** SUBTOTAL **	1,166,936	2,617,533	

Table V.1.14

Hawaii December 1989 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	937	1,908	2.04
Sharks	9,847	4,958	0.50
Eels	6	1	0.17
Bigeye scad (akule)	51,651	81,382	1.58
Mackerel scad	29,341	45,469	1.55
Leatherback	19	19	1.00
Ten pounder	34	34	1.00
Bonefish	449	471	1.05
Needlefish	3	3	1.00
Threadfin	323	1,506	4.66
Mullet	327	1,024	3.13
Pomfret	1,443	2,145	1.49
Snake mackerel	2,027	576	0.28
Jacks (misc)	9,139	15,770	1.73
Amberjack	1,298	1,042	0.80
Blue crevally	858	1,671	1.95
Pig-lipped ulua	4,545	7,575	1.67
Dobe ulua	195	199	1.02
White ulua	5,810	6,974	1.20
Giant sea bass	6,111	16,946	2.77
Blue spot grouper	39	85	2.18
Snappers	133	434	3.26
Blue lined snapper	3,715	3,407	0.92
Ehu (red snapper)	41,231	161,758	3.92
Gindai (flower snapper)	607	1,357	2.24
Kalekale (pink snapper)	3,233	6,481	2.00
Lehi (silverjaw)	4,382	12,185	2.78
Opakapaka (pink snapper)	49,699	164,102	3.30
Uku (gray snapper)	12,559	35,685	2.84
Porgy	50	94	1.88
Squirrelfish	2,098	5,558	2.65
Trumpetfish	16	17	1.06
Scorpionfish	605	1,996	3.30
Mountain bass	338	613	1.81
Bigeyes	228	306	1.34
Goatfish	5,203	16,032	3.08
Rudderfish	438	432	0.99
Damselfish	35	38	1.09
Hawkfish	67	111	1.66
Tilapia	117	432	3.69

Table V.1.14 (cont.)

Species	Pounds	Value	$/lb
Wrasse	1,082	2,535	2.34
Parrotfish	2,544	5,233	2.06
Surgeon/tangs	3,301	3,251	0.98
Triggerfish	26	7	0.27
Filefish	64	125	1.95
Rainbow runner	178	230	1.29
Mahimahi (dolphin)	23,116	57,941	2.51
Barracudas	1,185	2,637	2.23
Wahoo	21,772	71,400	3.28
Tunas	8	11	1.38
Skipjack tuna	205,107	347,497	1.69
Yellowfin tuna	149,582	392,262	2.62
Albacore	4,380	7,415	1.69
Bigeye tuna	192,048	696,268	3.63
Kawakawa	2,543	3,132	1.23
Billfish	105	221	2.10
Broadbill swordfish	28,408	129,548	4.56
Blue marlin	75,649	66,612	0.88
Black marlin	1,220	914	0.75
Striped marlin	59,380	65,842	1.11
Shortnose spearfish	10,516	7,158	0.68
Sailfish	60	100	1.67
Ocean moonfish	9,332	8,214	0.88
Spiny lobster	10,377	98,326	9.48
Slipper lobster	6,538	40,305	6.16
Crabs	2,724	16,913	6.21
Shrimp (freshwater)	57	285	5.00
Shrimp (saltwater)	16,396	77,851	4.75
Octopus	1,075	2,864	2.66
Squid	416	996	2.39
Limpets (saltwater)	892	2,451	2.75
Limpets (freshwater)	79	220	2.78
Sea cucumbers	9	32	3.56
Algae	435	1,630	3.75
** SUBTOTAL **	1,079,760	2,711,222	
** TOTAL **	13,975,479	32,426,745	

Figure V.1.1

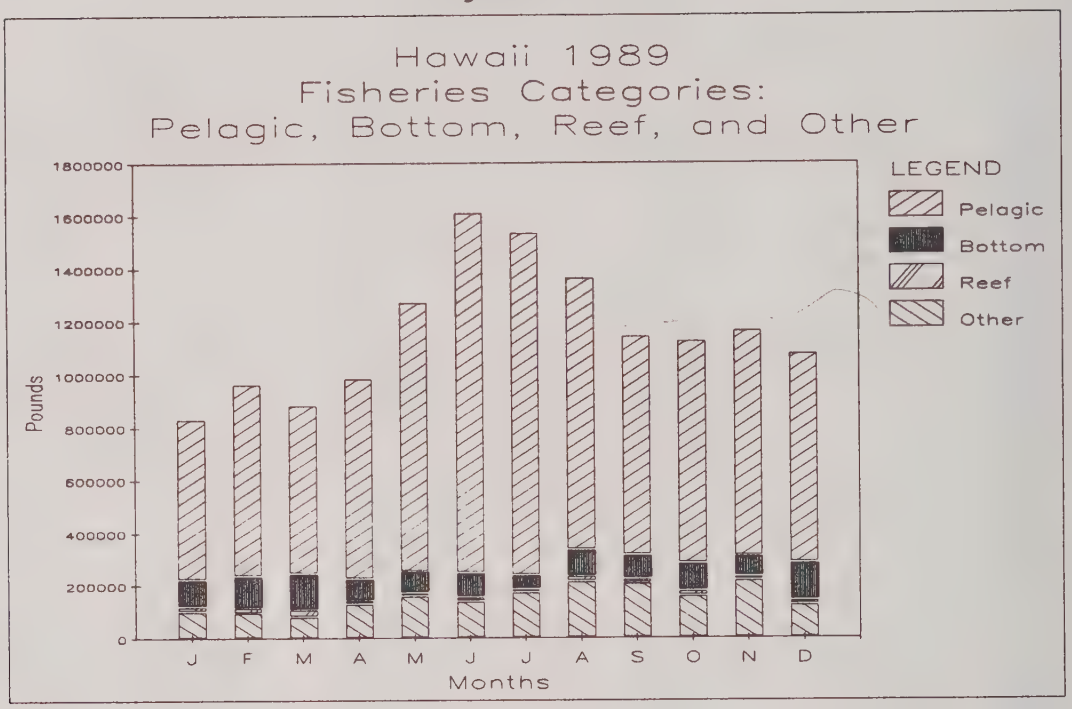


Figure V.1.2

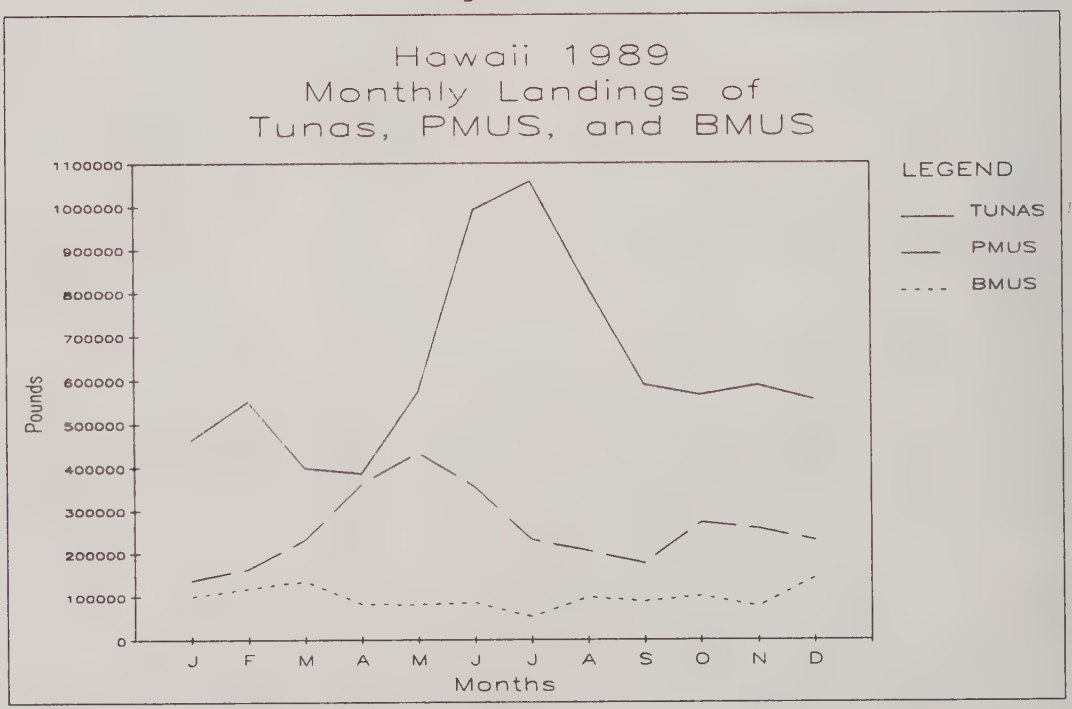


Figure V.1.3

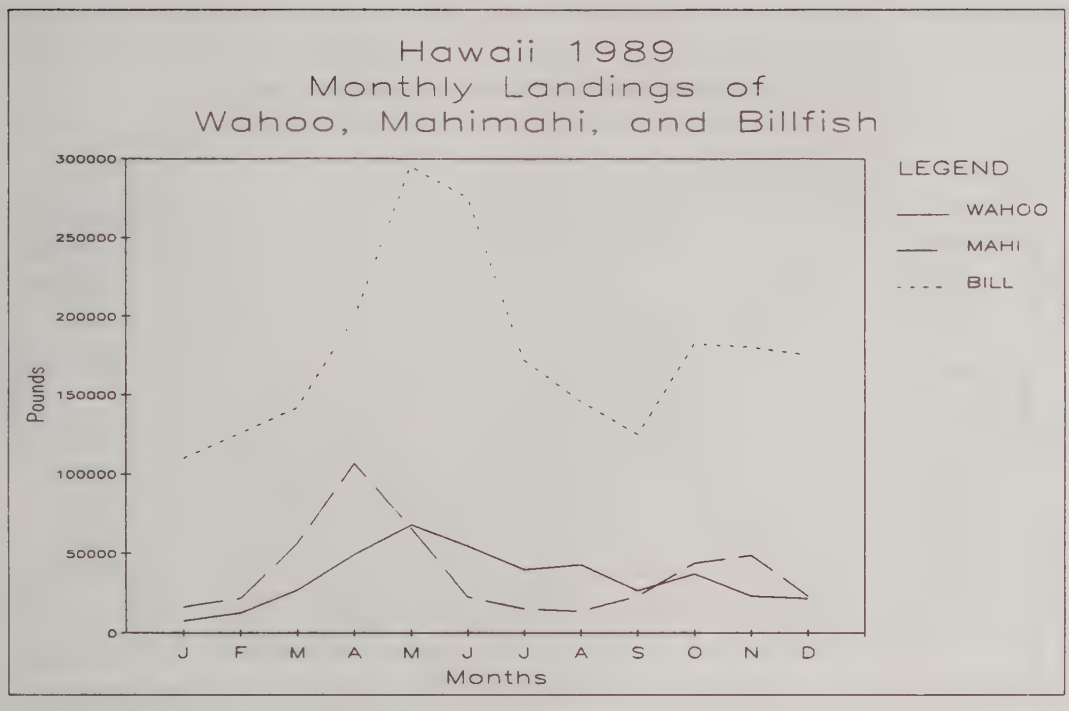


Figure V.1.4

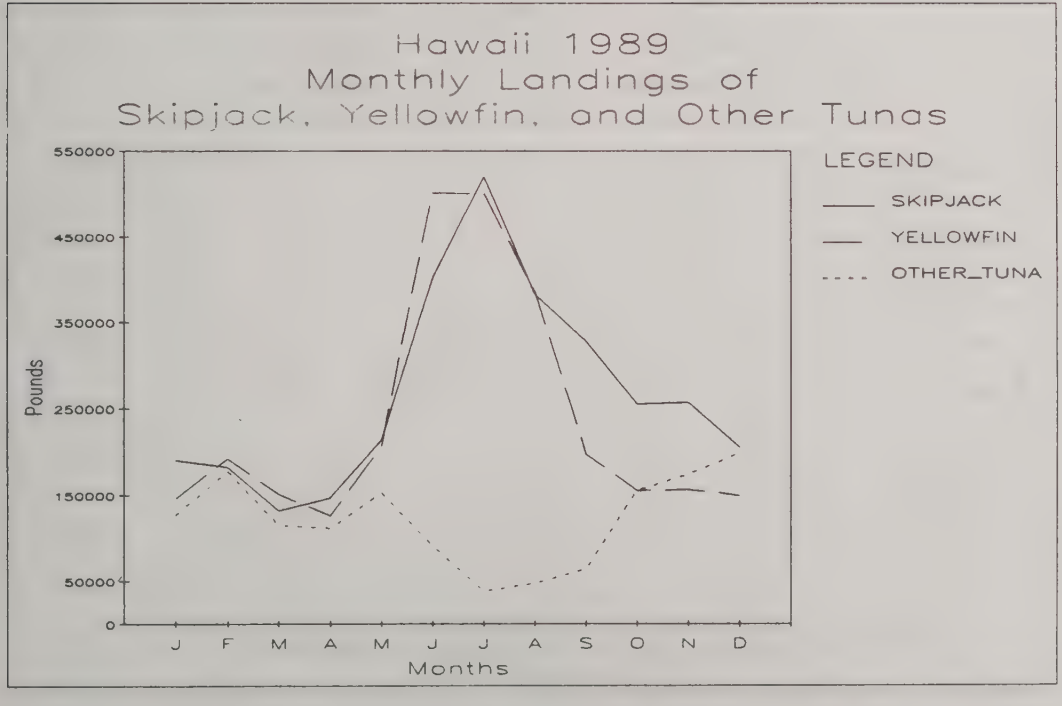
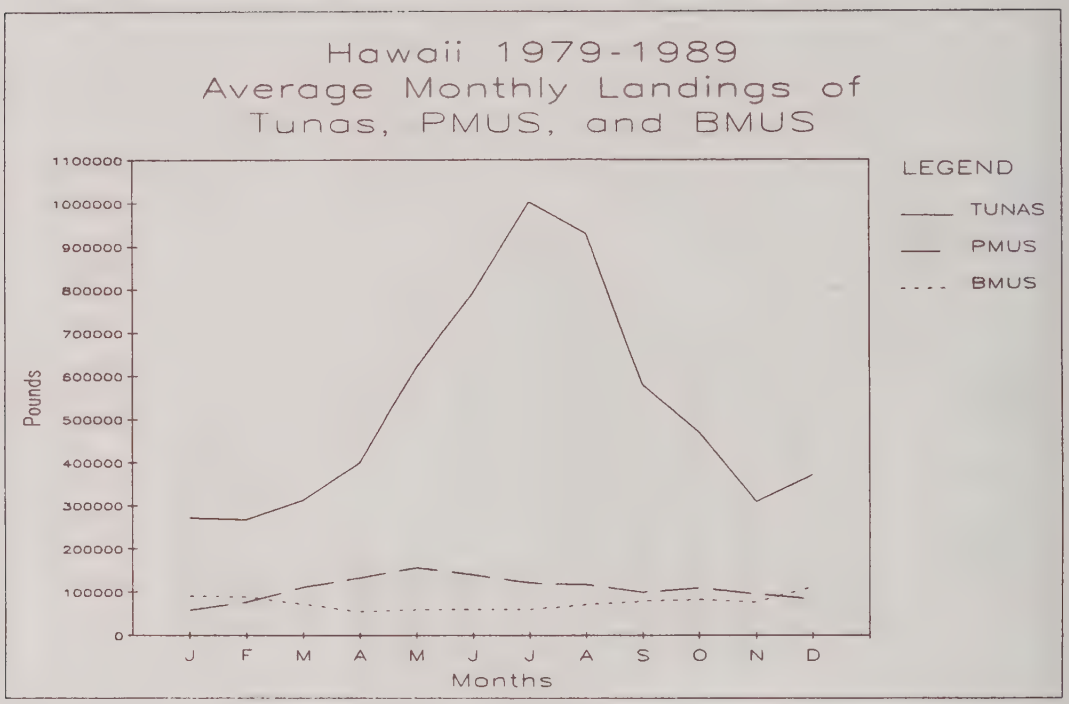


Figure V.2.1



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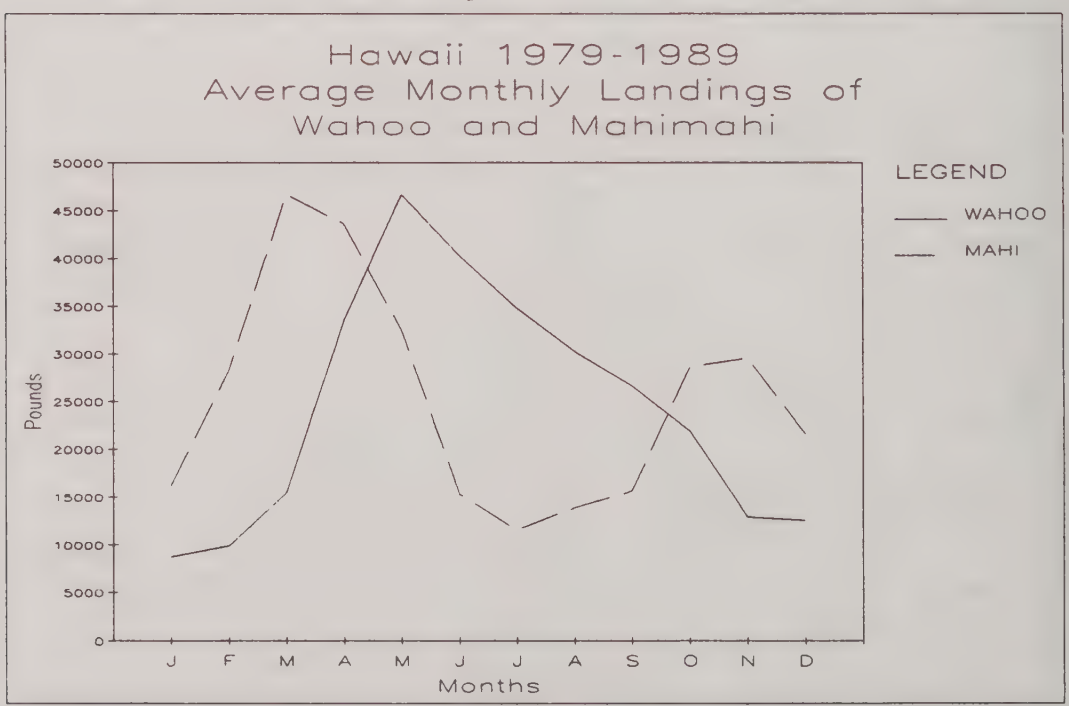


Figure V.2.3

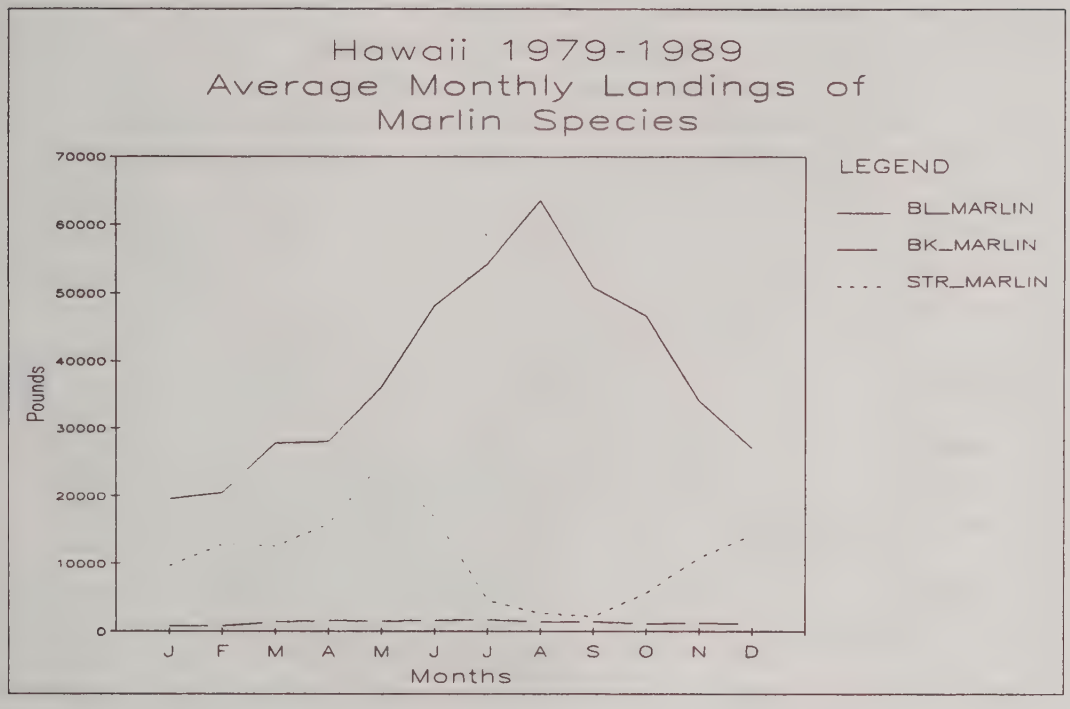


Figure V.2.4

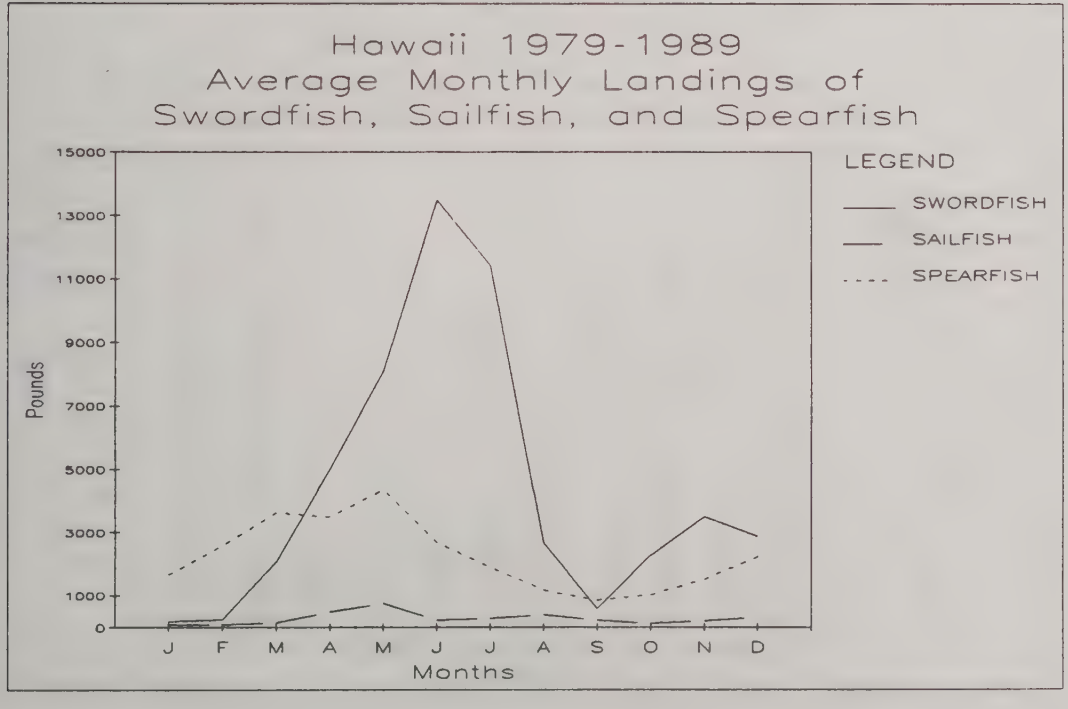


Figure V.2.5

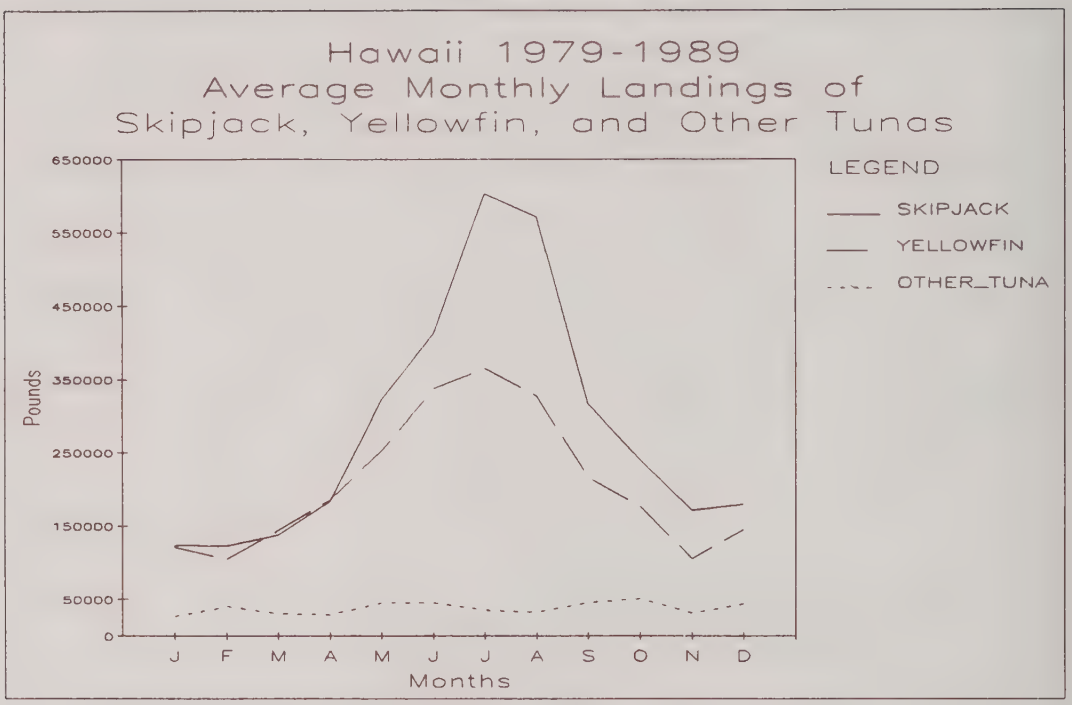


Figure V.2.6

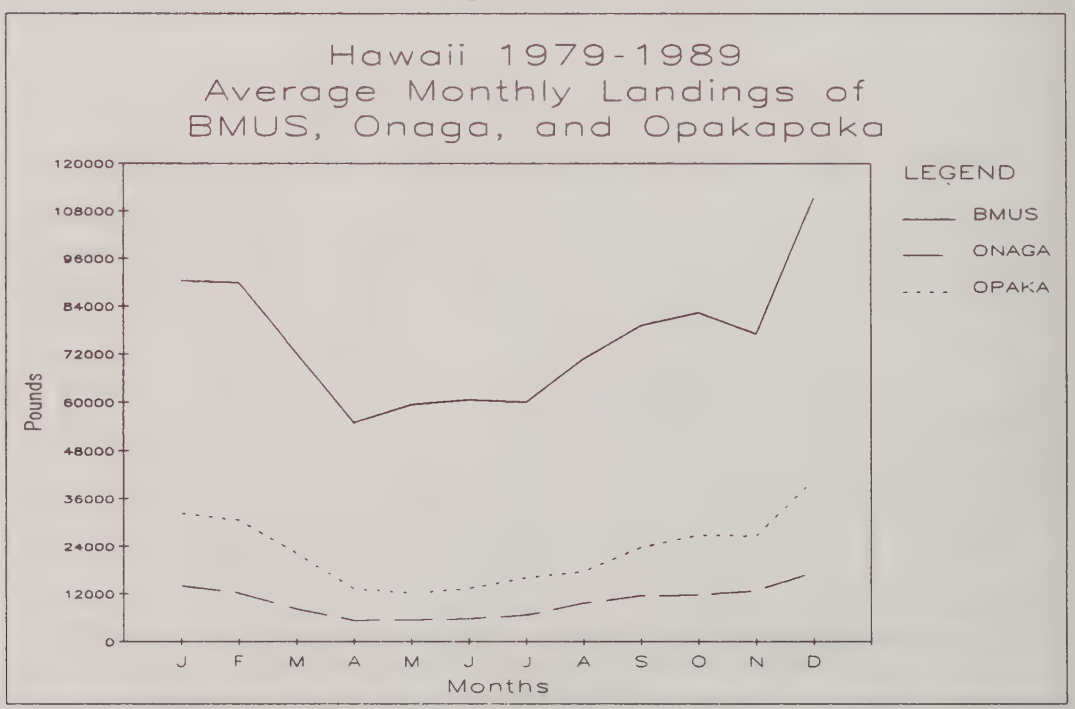


Figure V.2.7

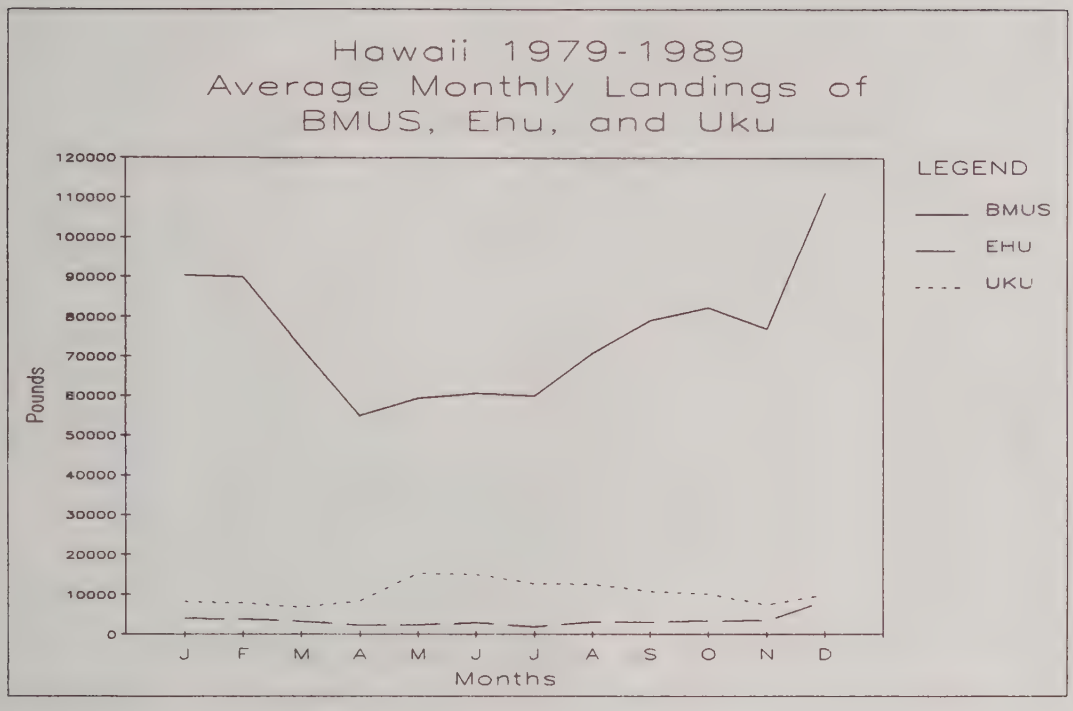


Figure V.3.1

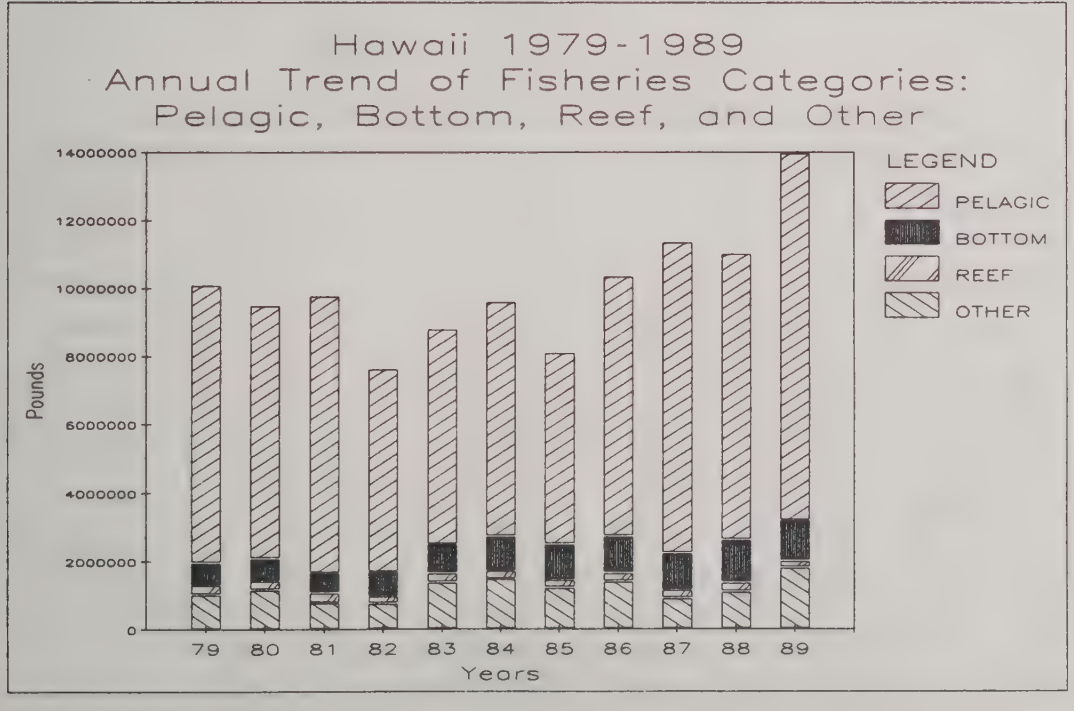


Figure V.3.2

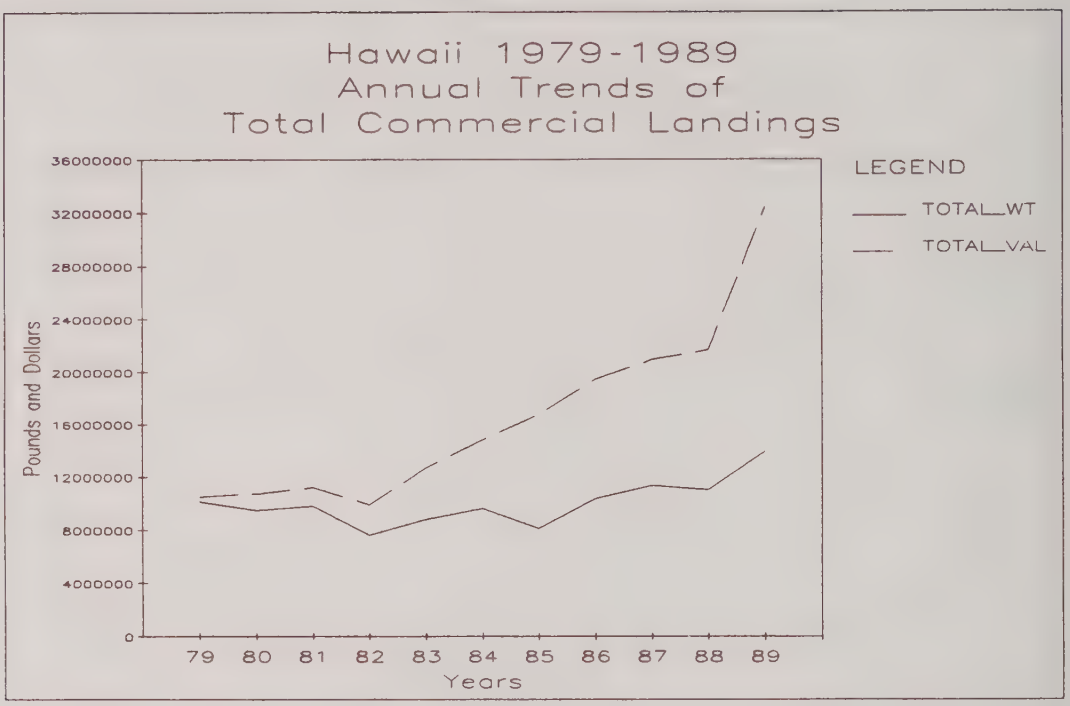


Figure V.3.3

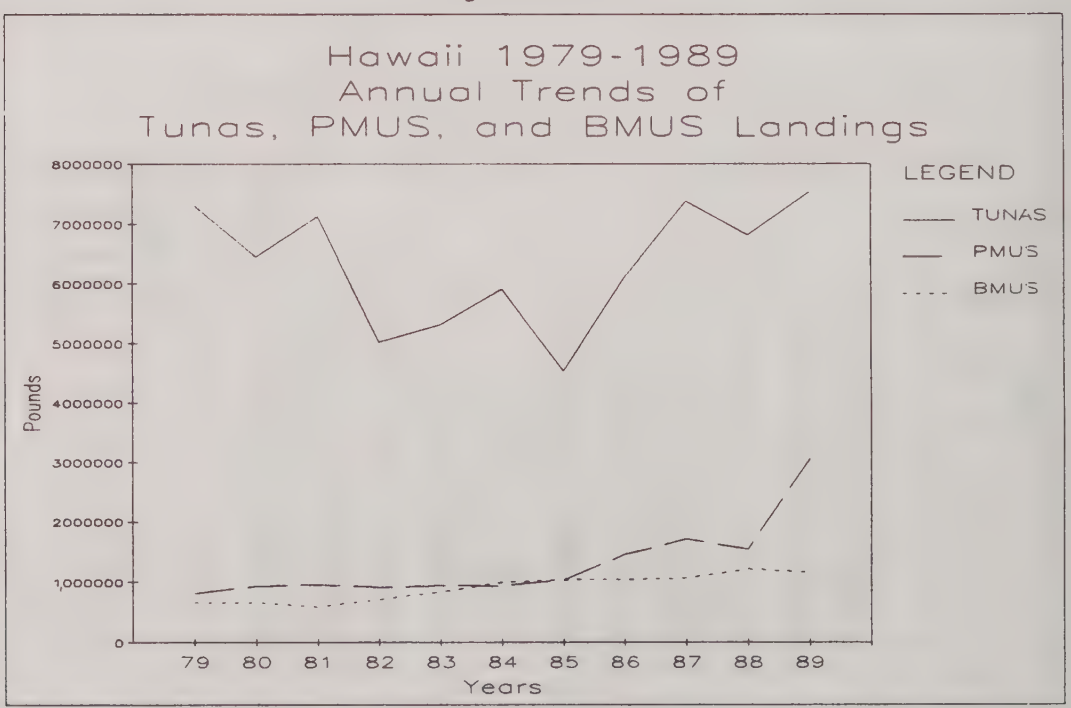


Figure V.3.4

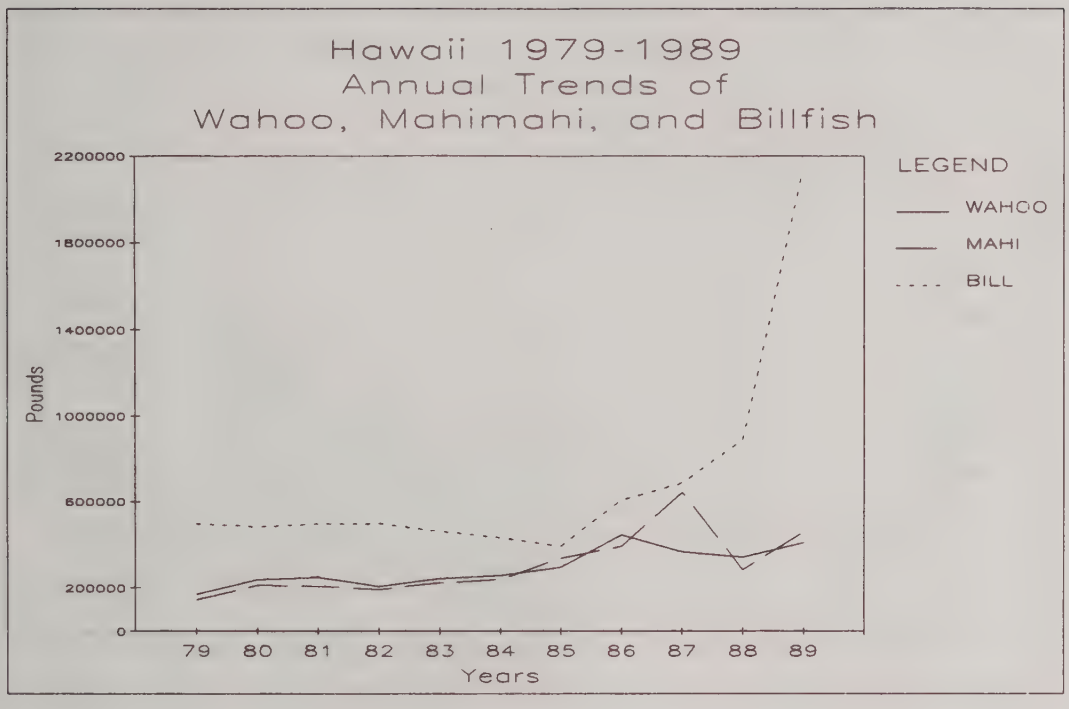


Figure V.3.5

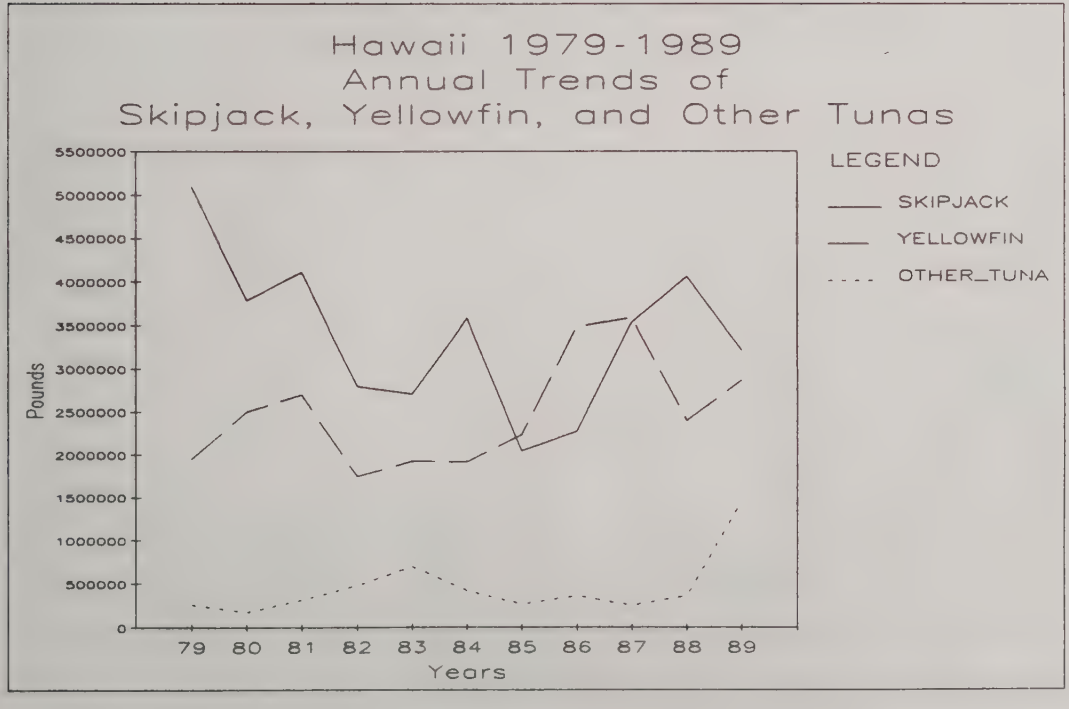
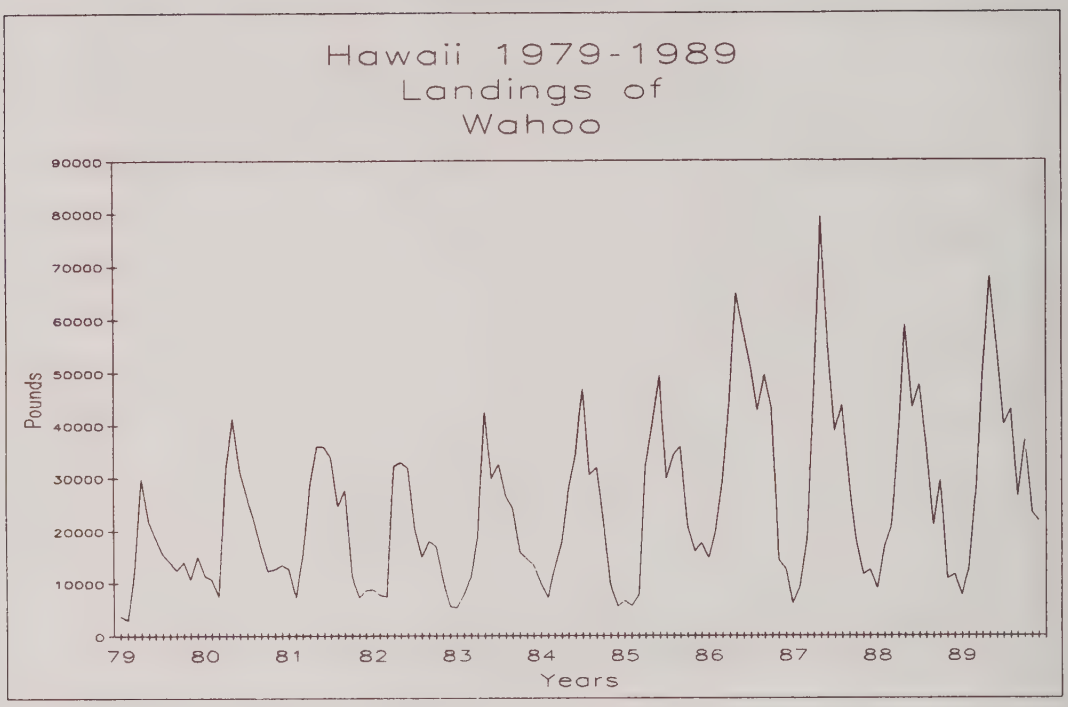


Figure V.4.1



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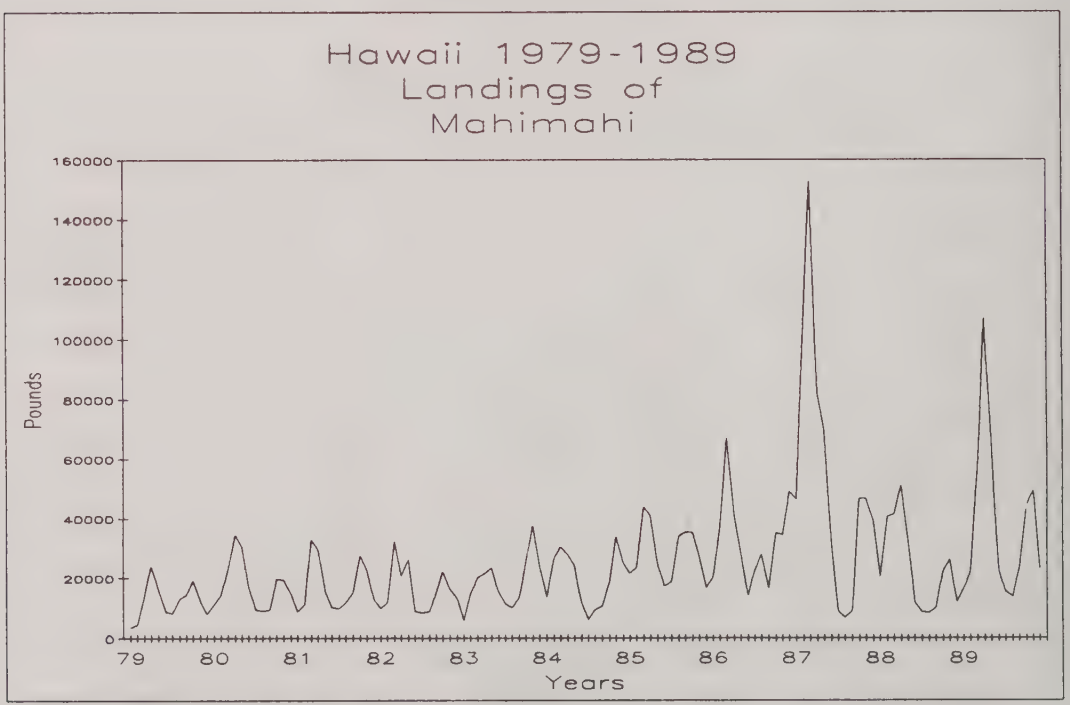

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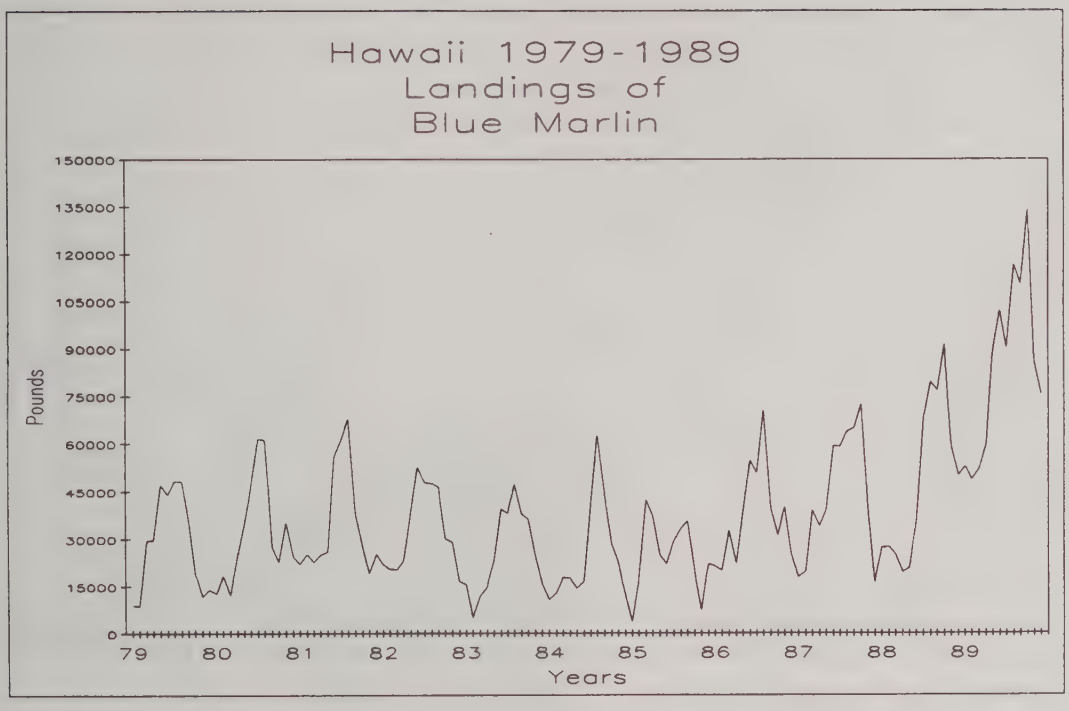
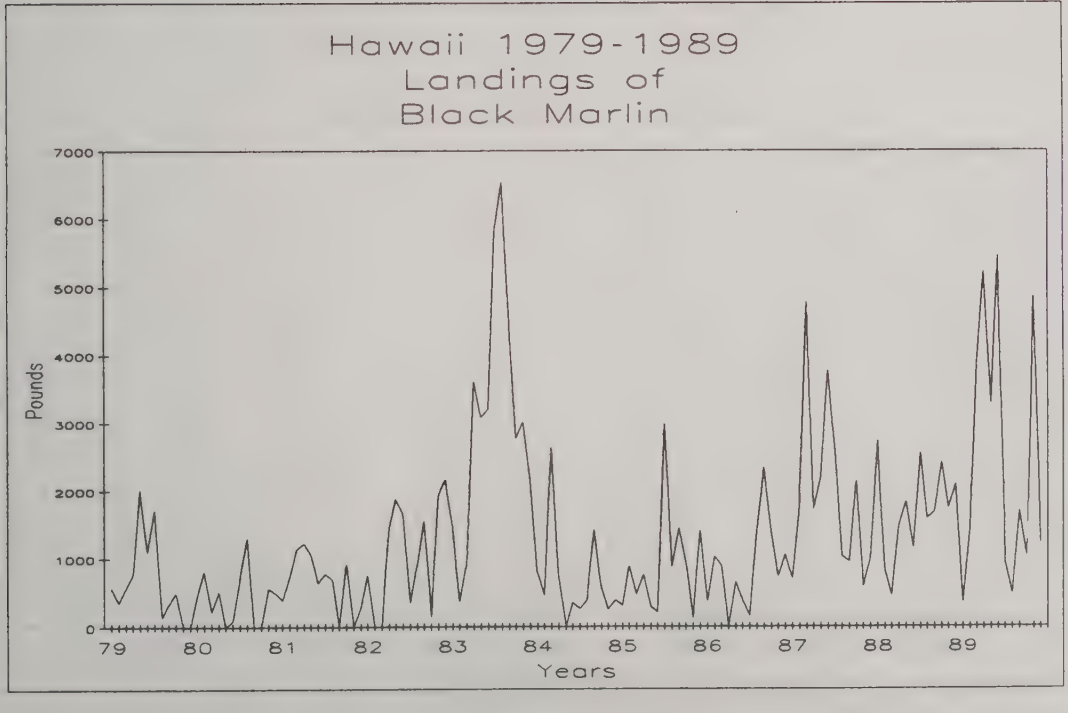


Figure V.4.4



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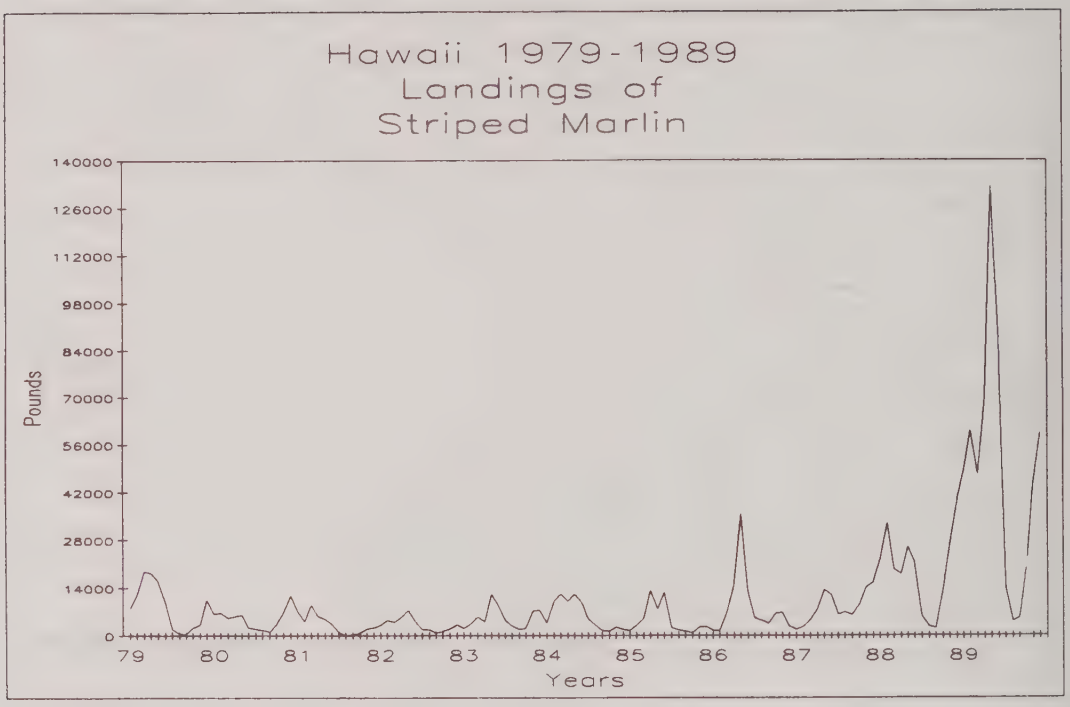

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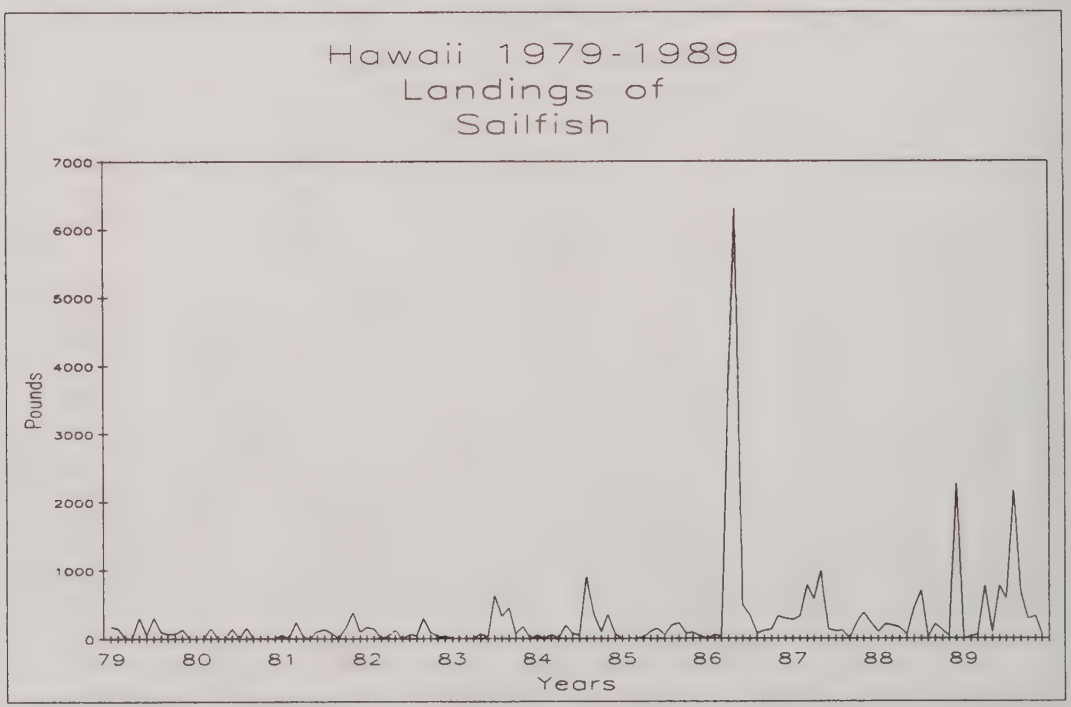
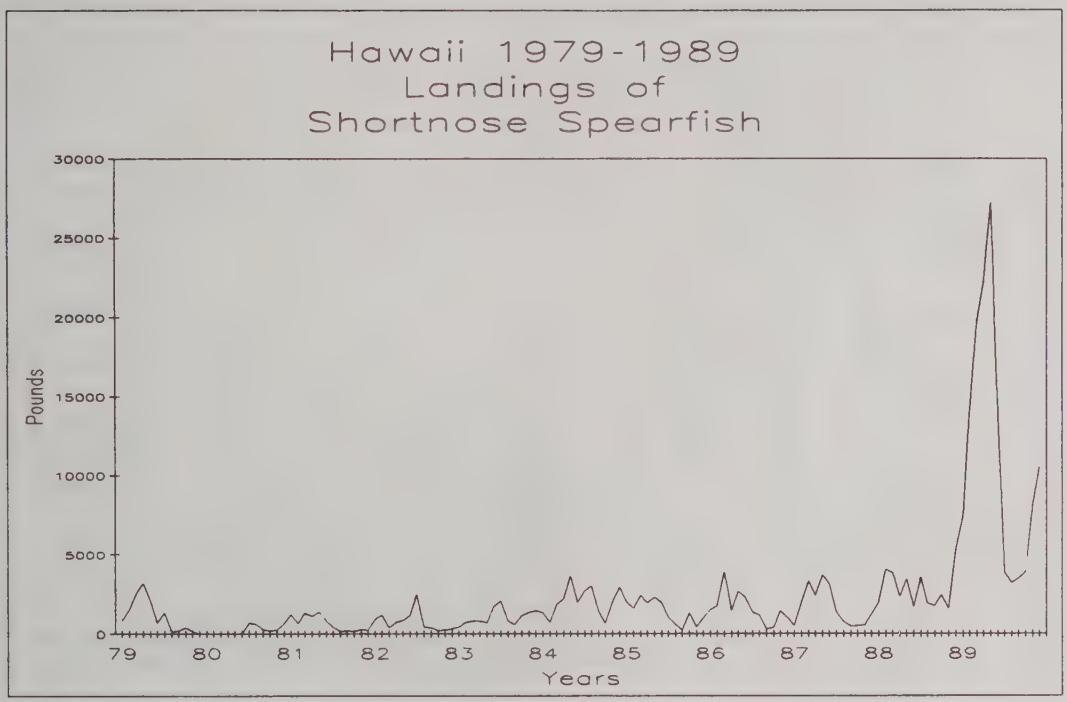


Figure V.4.7



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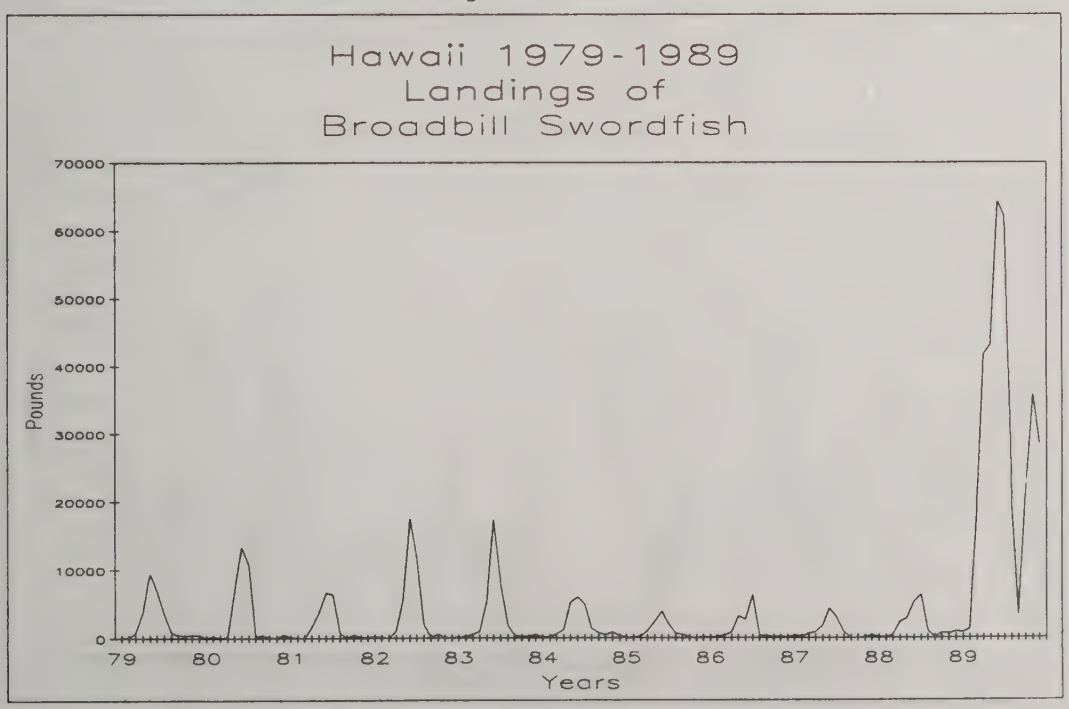

Figure V.4.9

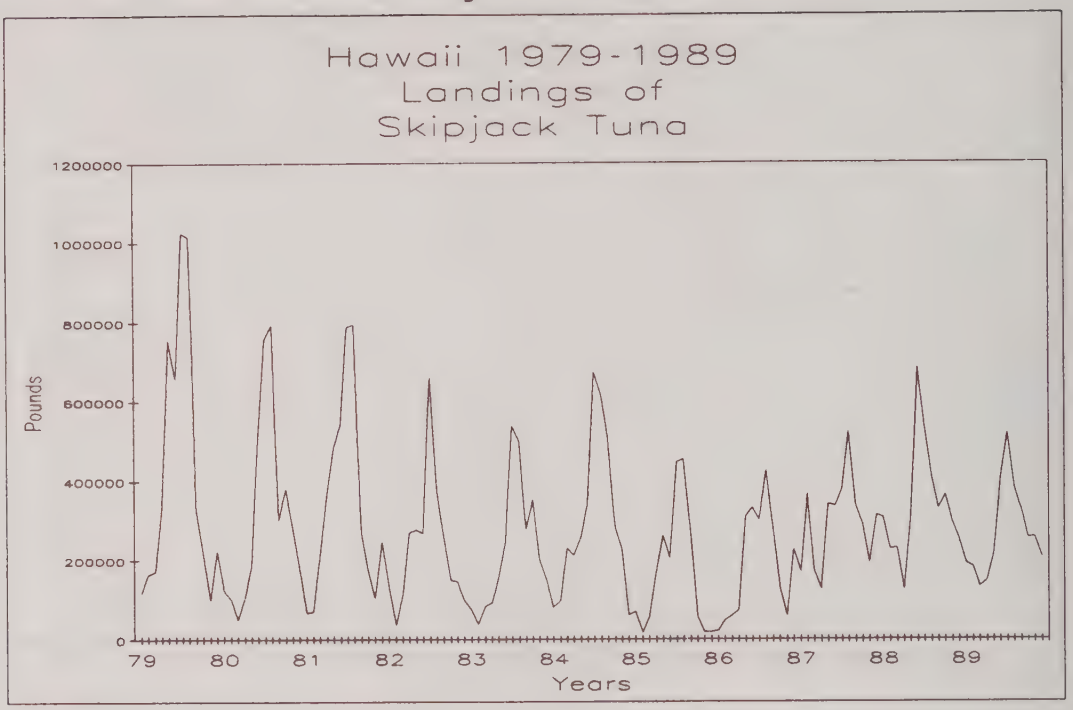

Figure V.4.10

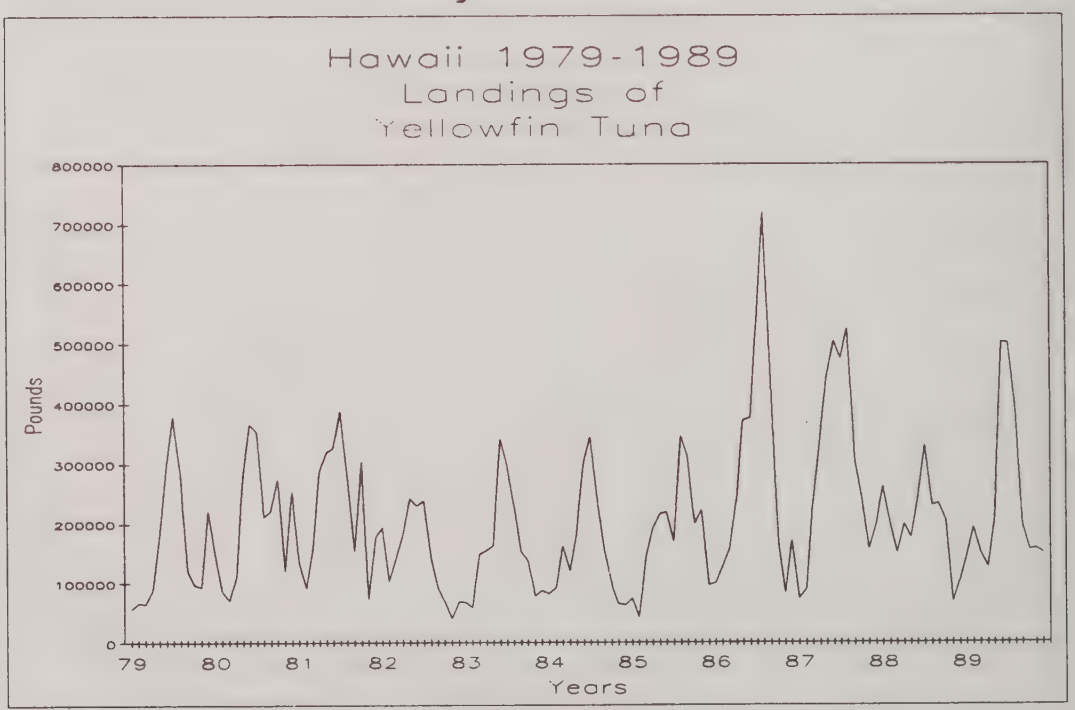

Figure V.4.11

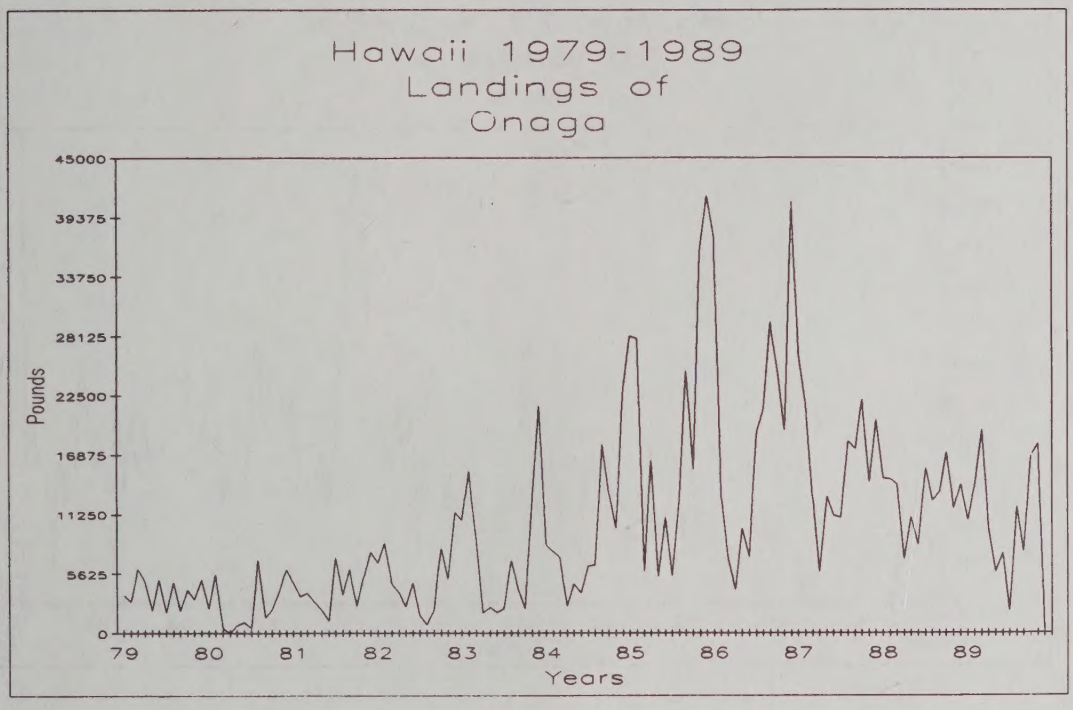

Figure V.4.12

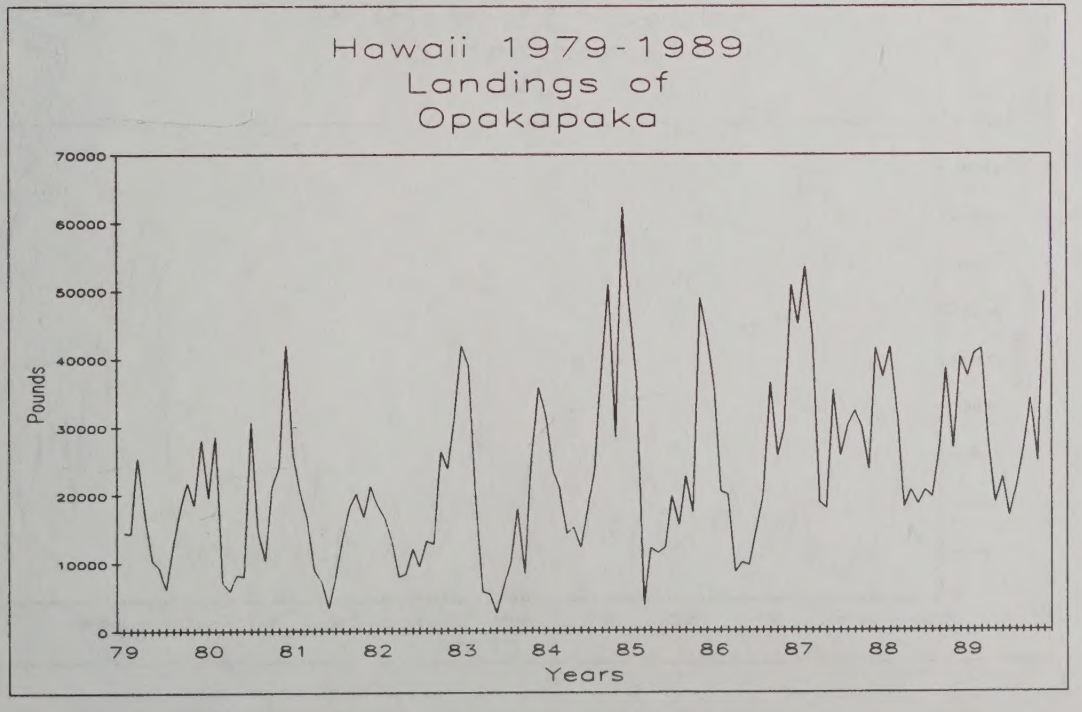

Figure V.4.13

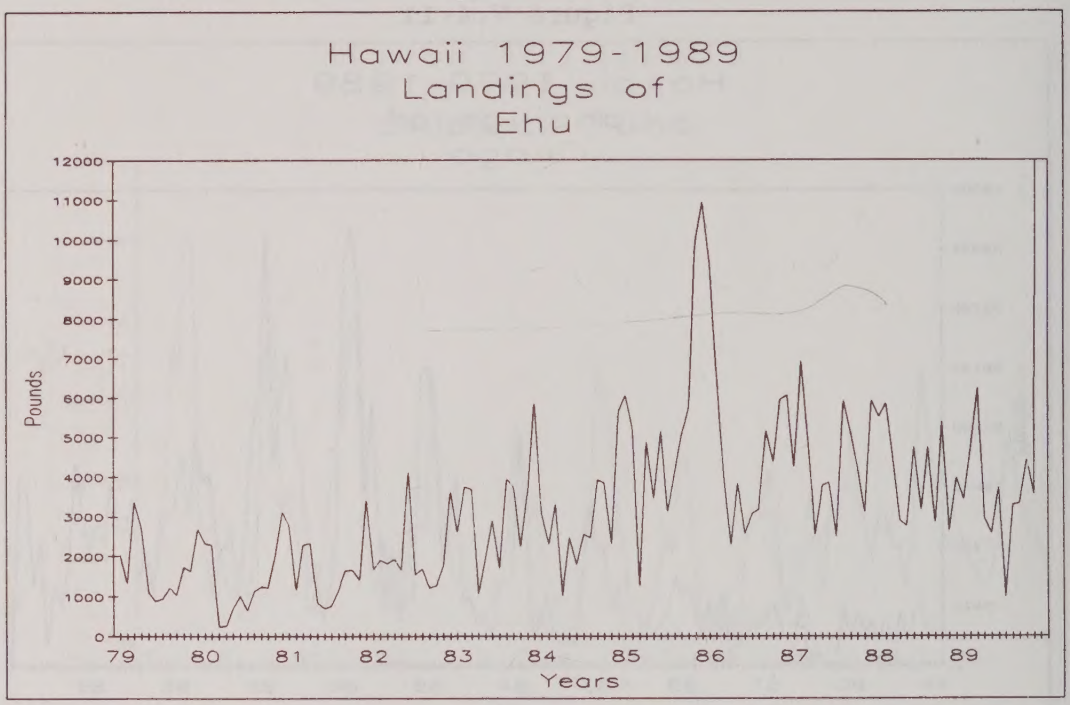

Figure V.4.14